

MONTHLY WEATHER REVIEW.

(GENERAL WEATHER SERVICE OF THE UNITED STATES.)

APRIL, 1890.

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PREPARED UNDER THE DIRECTION OF
BRIGADIER GENERAL A. W. GREELY,
CHIEF SIGNAL OFFICER OF THE ARMY.

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CAPTAIN, 4TH ARTILLERY, SIGNAL OFFICER.

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WASHINGTON CITY:
SIGNAL OFFICE.
1890.

List of merchant marine steam and sailing vessels from which International Meteorological reports were received at the office of the Chief Signal Officer, U. S. Army, Washington City, in time to be used in the preparation of the Monthly Weather Review for April, 1890.

Name of vessel.	Captain.	Name of vessel.	Captain.	Name of vessel.	Captain.
Br. s. s. Actor	D. James.	Br. s. s. Forward	Scott Gray.	Br. s. s. Pavonia	G. Roy.
Am. Adirondack	J. Sanson.	France	A. D. Hadley.	Dutch. P. Caland	G. Lutz.
Br. Adriatic	W. Roberts.	Friesland	W. G. Randle.	Br. Peconic	W. Harden.
Advanco	D. E. Griffiths.	Ger. Fulda	R. Ringk.	Am. Pennsylvania	E. B. Thomas.
Aguan	J. Adair.	Br. Furesia	J. Harris.	Br. Picqua	J. T. Lund.
Alaska	J. W. Morris.	Span. Gaitano	F. Goicoechea.	Br. Pocahontas	J. James.
Albany	G. B. Murray.	Gaelic	W. G. Pearne.	Ger. Polaris	F. Schroeder.
Alene	H. A. Gough.	Galileo	W. Magee.	Am. Portia	F. Ash.
Allegheny	E. J. Siders.	Galliot	C. Wright.	Dutch. Prins Maurits	A. Bibbelee.
Br. Allemannia	Geo. Thiele.	Geller	C. Kaempff.	Br. Prior	G. Graham.
Alber	H. Christoffers.	Germania	J. G. Cameron.	Procida	T. Fendt.
Alvema	F. McKay.	Gililand	M. L. Robinson.	Prussian	J. Ambury.
Alvo	David Williams.	Gilead	O. H. Bonnen.	Rhaetia	W. Kuhlwein.
América	A. Kohlmann.	Glenavie	F. H. Wyse.	Rhein	W. Kuhlmann.
Amsterdam	G. Stenger.	Glenfield	J. Newdick.	Rhosina	T. Pearn.
Dutch. Amy	H. Nichols.	Gloucester City	R. Jones.	Br. Rhynland	R. Weyer.
Anchoria	A. Campbell.	Good Hope	W. Dickman.	Br. Bialto	J. Akester.
Andean	A. H. Highton.	Gothenburg City	J. Harrison.	Richmond Hill	R. P. Bennett.
Arizona	S. Brooks.	Gothia	A. Kuhn.	Roman	E. Maddox.
Astronomer	J. Hughes.	Graf Bismarck	W. Topser.	Dutch. Rotterdam	H. C. v. d. Zee.
Athos	H. Low.	Grasbrook	H. Schuler.	Ger. Rugia	R. Karlowa.
Attila	A. Barclay.	Grecian	C. E. Le Gallais.	Br. Runie	T. P. Thompson.
Aurania	Thos. Dutton.	Greco	A. J. Jeffrey.	Ger. Russin	F. Reuter.
Baltimore	C. W. Simpson.	Hans & Kurt	Carl Hoelck.	Sanle	H. Richter.
Barrowmore	W. H. Moore.	Haytian	J. Coward.	Am. Saginaw	H. B. Kelly.
Bavarian	M. Pitt.	Heika	A. G. Thomsen.	Br. Saint Romans	H. Campbell.
Bede	W. Anderson.	Helvetia	R. Landier.	Salerno	B. H. Rogers.
Belgenland	E. Benoe.	Hexham	T. D. Adams.	Samaria	T. Hewitson.
Bedford	Geo. Bain.	Hindoo	Thos. Douglas.	Am. Saratoga	C. P. Leighton.
Belarabia	J. Martin.	Holland	Thos. Foote.	Br. Sardinian	W. Richardson.
Blakemoor	G. Harrison.	Holatia	G. Busch.	Sarna	J. Gibson.
Bohemia	H. Leithausen.	Huntington	C. A. Payne.	Ger. Scandia	E. Kopff.
Blue Jacket	J. A. Pauli.	Iago	F. W. Ouston.	Br. Scandinavia	J. Franco.
Bothnia	G. B. Watt.	Ilisativa	A. Canzoneri.	Am. Scythia	T. Roberts.
Brazdale	W. Ward.	Iowa	E. W. Owens.	Br. Seneca	F. Stevens.
British Empire	R. Wills.	Irlington	C. W. Barnard.	Br. Servia	H. Walker.
British Prince	S. Nowell.	Island	W. Skjott.	Siberian	J. Park.
British Princess	E. H. Freeth.	Isirian	A. W. Ball.	Sicilia	W. Symons.
Brooklyn City	W. Pitt.	Italy	W. Pearce.	Ger. Slavonia	H. Schmidt.
Brunel	J. W. Henderson.	Ixia	W. Chruside.	Br. Sirius	T. P. Fisher.
Buenos Ayren	R. Carruthers.	Kansas	A. Fenton.	Ger. Spaurdam	F. H. Bonjer.
Bruffalo	J. H. Malet.	Karlruhe	F. Kepler.	Br. Spain	W. A. Griffiths.
Bulgarian	R. Leask.	Kathleen	G. Thompson.	State of Indiana	A. Ritchie.
Camden	W. N. James.	Kepler	M. Flett.	State of Nebraska	A. G. Brues.
Camellia	E. Penney.	Kong Frode	Kjerneff.	State of Nevada	J. A. Stewart.
Canada	J. Robinson.	La Bretagne	M. de Joussetin.	State of Pennsylvania	A. J. A. Mann.
Cassius	C. Rix.	La Campine	E. Smil.	Statesman	Wm. Jones.
Catalonia	J. J. Atkin.	La Champagne	Boyer.	Steinhoff	H. Spillett.
Catania	H. M. Frank.	La Flandre	M. W. Nines.	Br. Stockholm City	W. Thompson.
Cephalonia	W. S. Seccombe.	La Gasconne	Santelli.	Strabo	A. Matheson.
Cervin	S. Hugheson.	Lahn	H. Hellmers.	Strathairly	W. Winn.
Chalmette	J. B. Percy.	Lake Huron	P. D. Murray.	Stura	C. Cadaro.
Chateau Lafite	M. C. Ollivier.	Lake Nepigon	C. F. Herriman.	Belg. Swita Land	J. Ueberweg.
Cherokee	H. A. Bearse.	Lake Superior	Wm. Stewart.	Ger. Taormina	G. W. Loch.
Chicago	G. Scarr.	Lampasas	M. B. Crowell.	Br. Teutonic	P. J. Irving.
Circassia	J. Hedderwick.	La Normandie	G. Collier.	Texas	T. T. King.
Circassian	A. McDougall.	Leonora	J. de Alegria.	Thunemore	A. J. Baxter.
Circe	E. C. Jennings.	Leipzig	D. Kohlenbeck.	The Queen	T. P. Heeley.
City of Alexandria	J. B. Allen.	Leona	James Bolger.	Thingvalla	S. T. H. Laub.
City of Berlin	A. W. Lewis.	Lepanto	H. S. S. Wise.	Thurston	Thos. Vasey.
City of Chester	E. F. Barff.	Lissacrieve	F. R. Evans.	Toronto	J. Macduley.
City of Chicago	A. Redford.	Lord Clive	P. Urquhart.	Tower Hill	Thomas Parsons.
City of Newcastle	R. Townsend.	Lord Gough	E. M. Hughes.	Tordenskjold	C. Uchermann.
City of Para	J. L. Lockwood.	Lord O'Neil	A. Ferris.	Trave	W. Willigerod.
City of Rome	H. Young.	Louisiana	E. V. Gager.	Tresco	J. R. Barber.
City of Savannah	C. B. Googins.	Ludgate Hill	H. H. Perry.	Trojan	W. G. Browne.
City of Washington	T. C. Reynolds.	Lydian Monarch	T. C. Huggett.	Ulunda	T. Clark.
Colan	R. Fraser.	Maastricht	A. Patjer.	Umbria	W. McMickan.
Colina	E. C. Jennings.	Main	M. Moller.	Vancouver	C. J. Lindall.
Colorado	F. E. Jenkins.	Majestic	H. Parsell.	Venetian	E. Parry.
Columbia	R. Garrick.	Manhattan	E. Leighton.	Viking	F. Hastund.
Columbia	H. Vogelgesang.	Manitoba	J. M. Johnston.	Ville de Donal	Dependant.
Cornucopia	J. Smith.	Marengo	W. Whitton.	Waesland	C. H. Grant.
Counsellor	J. G. Jones.	Marsala	N. Maus.	Waterloo	J. P. Turner.
Crane	G. J. Robinson.	Martello	W. Abbott.	Dutch. Werkendam	W. Bakker.
Croma	W. E. Lord.	Maryland	H. Murrill.	Ger. Werra	R. Bussius.
Cusle	R. Nicol.	Mascotte	Jas. Ross.	Weser	H. Winter.
Cyprus	E. Guild.	Mentmore	R. Walte.	Belg. Westernland	J. C. Jamison.
Damaria	G. Dixon.	Michigan	S. Walters.	Ger. Wieland	H. Baranda.
Dania	H. Barends.	Millfield	Chas. Kirby.	Br. Wilton	W. J. Jackson.
Darial	A. H. F. Young.	Minia	Sam. Trott.	Wisconsin	J. P. Worrel.
Denmark	R. S. Rigby.	Minister Maybach	B. Schierhorst.	Wylo	T. L. Rogers.
Devonia	Jno. Craig.	Miranda	H. Leserman.	Wyoming	C. L. Rigby.
Devonshire	A. Purvis.	Minnesota	R. Griffiths.		
Dewland	J. Hunter.	Missouri	T. F. Gates.		
Dresden	H. Bruns.	Moravia	O. Winkler.		
Durham City	J. A. Jacobsen.	Morua	J. A. Broadfoot.		
Earnwell	C. N. Mumford.	Mutiel	G. S. Locke.		
Edwila	W. T. Stacey.	Navarro	S. de Felleria.		
Egypt	J. Sumner.	Nederland	E. Bence.		
Egyptian Monarch	T. M. Irvin.	Nevada	J. A. B. Cash		
Elder	H. Baur.	New Orleans	T. P. C. Halsey.		
Elbe	C. Thalenhorst.	Newport	W. G. Shackford.		
Electricque	P. Charles.	Noordland	H. Z. Nickels.		
Elfrida	W. Rasmussen.	Norseman	R. Williams.		
Elgiva	H. Bempohl.	Norwegian	W. Christie.		
Elmville	J. Dove.	Nueces	Sam. Risk.		
El Paso	H. S. Quick.	Ocean	A. Voqe.		
Elvaaton	W. E. Steele.	Oceanic	W. W. Smith.		
Emu	R. Sander.	Ohio	R. W. Sargent.		
Entella	V. Bruno.	Ohio	P. L. Moore.		
Ethiopia	John Wilson.	Ontario	W. P. Couch.		
Etruria	W. H. P. Hains.	Oranmore	W. J. Moffat.		
Euripides	J. Herd.	Oregon	H. C. Williams.		
European	R. Johnson.	Orinoco	J. S. Garvin.		
Euskaro	M. Zaballadicechea.	Orizaba	J. McIntosh.		
Exeter City	T. L. Weiss.	Osmantli	Chas. O'Hagan.		
Excelsior	H. L. Higgins.	Othello	H. Mundy.		
Federation	R. Pinkham.	Osama	C. O. Rockwell.		
Feynlands	J. B. Sellers.	Parisian	J. Ritchie.		

United States Naval.

U. S. C. S. A. D. Bache	J. F. Moser.
U. S. S. Despatch	W. S. Cowles.
U. S. C. S. schr. Eagle	W. P. Elliott.
U. S. C. S. schr. Earnest	J. N. Jordan.
U. S. F. C. S. Fish Hawk	R. Platt.
U. S. S. Galena	G. W. Sumner.
U. S. C. S. G. S. Blake	C. E. Vreeland.
U. S. C. S. Gedney	J. M. Helm.
U. S. S. Independence	J. W. Philip.
U. S. S. Iroquois	J. Bishop.
U. S. S. Kearney	H. Elmer.
U. S. C. & G. S. McArthur	D. H. Mahan.
U. S. S. Minnesota	G. C. Wiltse.
U. S. S. New Hampshire	F. J. Higginson.
U. S. S. Thetis	C. H. Stockton.

Sailing vessels.

Am. bg. Abbie Clifford	D. W. Story.
Br. bk. Abyssinia	B. B. Hilton.
Am. Ada P. Gould	W. B. Henrahan.
It. Adele	M. Astarita.
Am. bk. Alice	W. G. Knir.
Br. schr. Anna E. Krant	T. Newcomb.
Br. sp. Argus	R. Ramsey.
Am. schr. Belle of the Bay	J. W. Emmons.

*This publication will not be
disposed of without authority of the
Chief Signal Officer.*

UNITED STATES SIGNAL SERVICE

MONTHLY WEATHER REVIEW.

VOL. XVIII.

WASHINGTON CITY, APRIL, 1890.

No. 4.

INTRODUCTION.

This REVIEW is based on reports for April, 1890, from 2,296 regular and voluntary observers. These reports are classified as follows: 170 reports from Signal Service stations; 124 reports from United States Army post surgeons; 1,423 monthly reports from state weather service and voluntary observers; 23 reports from Canadian stations; 180 reports through the Central Pacific Railway Company; 376 marine reports through the co-operation of the Hydrographic Office, Navy Department; marine reports through the "New York Herald Weather Service;" monthly weather reports from the local weather services of Alabama, Arkansas, Colorado, Illinois,

Indiana, The Iowa Weather Crop Bulletin Service, Kansas, Kentucky, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Meteorological Report of the Missouri State Board of Agriculture, Nebraska, Nevada, New England, New Jersey, New York, North Carolina, North and South Dakota, Ohio, Oregon, Pennsylvania, South Carolina, Tennessee, and Texas, and international simultaneous observations. Trustworthy newspaper extracts and special reports have also been used.

Reports of rainfall observations of the United States Geological Survey in Colorado, New Mexico, and Arizona were not received for April, 1890.

CHARACTERISTICS OF THE WEATHER FOR APRIL, 1890.

The great flood in the lower Mississippi valley continued throughout the month. On the 1st the river was rising at Cairo, Ill., and Memphis, Tenn., and was nearly stationary or falling slowly from Memphis to New Orleans. The breaks at Offutt and Skipwith, Miss., had flooded the southern part of Washington, Issaquena, and western Sharkey counties, Miss.; Huntington, Bolivar Co., Miss., was inundated; and the land back of Rolling Fork and Mayersville, Miss., was flooded. In Louisiana water from the Nita crevasse covered the greater portion of Saint James, Saint Charles, Saint John, and Jefferson parishes as early as the 4th of the month, and on the 13th it reached the Illinois Central Railroad, and within twenty-four hours had covered the tracks for twenty miles. A large amount of water from this crevasse found its way into Lake Pontchartrain by means of the Manchac Passes. The Austin, Miss., crevasse, which occurred March 30th, overflowed about 10,000 acres in Mississippi. On the Arkansas side of the river about 10,000 acres were inundated. The following are the more important crevasses reported for April: On the 4th a crevasse occurred at Catfish Point, Miss., which rapidly widened to fifteen hundred feet; several thousand acres of cultivated land were submerged, many houses washed away, and much stock drowned. On the 7th the Opossum Fork levee, seventy-seven miles above Vicksburg, Miss., was cut, and great damage was done to adjacent property. On the 21st the upper end of the old Morganza levee, Pointe Coupee parish, La., gave way, and crevasses occurred in the levees of the Pointe Coupee front from the 22d to the 25th, that of the 25th in the lower Morganza levee being twelve hundred feet wide. The Pointe Coupee levees protected the sugar belt and were the most important in Louisiana, or in the entire Mississippi system. The principal of these was the great Morganza levee, which was the first to go, and it was closely followed by numerous other breaks, and practically the entire parish was flooded. At the close of the month not less than fifteen parishes, or about one-fourth of the state of Louisiana, had been affected by the flood, and the country generally between the Mississippi and Ouachita rivers was under water. On the 3d the water reached 48.7 feet on the gauge at Cairo, Ill., where

it remained nearly stationary until the 6th; this was the highest water reached at that point during the current month. On the 3d the river again reached the danger-point, 35.6 feet, at Memphis, Tenn. On the 22d the highest water of the month, 31.9 feet, was reported at Plaquemine, La. On the 23d the Red River fell below the danger-point, 29.9 feet, at Shreveport, La., and the highest water of the month, 48.55 feet, occurred at Natchez, Miss. On the 24th the highest water of the month, 45.1 feet, occurred at Saint Joseph, La. On the 28th the Red River had again reached the danger-line at Shreveport, La., and at the close of the month had risen to 30.6 feet, the highest point reached this year. At the close of the month the river was 3.8 feet below the danger-line at Cairo, Ill., and rising; 4.4 feet above at Memphis, Tenn., and rising; 4.3 feet below at Helena, Ark., and falling; 8.6 feet above at Vicksburg, Miss., and falling; 1.7 foot above at New Orleans, La., and falling. At Shreveport, La., the Red River was 1.6 foot above the danger-line and rising. The Arkansas River was 2.5 feet above the danger-line at Fort Smith, Ark., and falling, and 1.3 foot above at Little Rock, Ark., and falling. The Ohio River fell below the danger-line at Louisville, Ky., on the 1st.

The highest temperature noted at a regular station of the Signal Service was 98°, at Yuma, Ariz., on the 28th, and temperature rising to 105° on the 30th was reported by the voluntary observer at Gove City, Kans. The lowest temperature reported was -17°, at Pokegama Falls, Minn., on the 1st. The month was warmer than the average April, except in the extreme northeastern and southeastern, the south-central, and extreme northwestern parts of the country, and along the immediate middle and south Pacific coasts. The greatest departures above the average temperature occurred on the North Carolina coast and within an area extending from northwestern Minnesota southwestward over North Dakota, where they were more than 5°, and the most marked departures below the average temperature were noted on the north Pacific coast, where they averaged more than 2° and exceeded 6° at a seven-year record station. At stations in North Carolina, Iowa, and Nebraska, the mean temperature was higher than previously noted for April; at stations in the south Atlantic states, the

Missouri and upper Mississippi valleys, on the northeastern slope of the Rocky Mountains, in the northern plateau region, and along the north Pacific coast the maximum temperature was as high or higher than reported for April of preceding years; and at stations on the eastern slope of the Rocky Mountains, in the southern and northern plateau regions, and on the north Pacific coast the minimum temperature was as low or lower than previously reported for April.

In New Jersey the peach crop was damaged by cold on the 1st, 2d, 19th, and 20th. On the 20th frost damaged young fruit trees and killed tender plants in Virginia. On the 11th and 21st frost injured crops, vegetables, and fruit in South Carolina. On the 10th light frost damaged tender plants at Little Rock, Ark. On the 11th and 12th frost injured the peach crop in Oregon. On the 12th and 13th buds of raisin vines in the neighborhood of Fresno, Cal., were killed by cold.

The heaviest monthly precipitation reported was 16.85, at Columbia, La., and the rainfall exceeded ten inches in areas in the west Gulf states and in Siskiyou county, Cal. In areas in southwestern Arizona, southern California, southwestern Idaho, northeastern Montana, western Nevada, extreme western Texas, and central Utah no precipitation was reported. The precipitation was in excess of the average for the month at several stations on the south New England and middle Atlantic coasts, in the west Gulf states and thence northwestward over southern Missouri, the northern part of the Ohio Valley, and the eastern part of the upper lake region, along the eastern slope of the Rocky Mountains south of the forty-fifth parallel, in southeastern Arizona, and on the extreme north Pacific coast; elsewhere the precipitation was deficient. The greatest excess in precipitation occurred in south-central Indian Territory and thence southward to central Texas, and in south-central

Louisiana, where it was more than six inches, and the most marked deficiency was noted in central Alabama, where it was more than four inches. In the Rio Grande Valley and over the southeastern slope of the Rocky Mountains more than three times the usual amount of rain fell; over the southern plateau region nearly double the usual amount; and in the west Gulf states the precipitation was about one-half greater than the average for April. On the south Pacific coast the monthly precipitation was one-tenth, over the northern plateau region about one-fourth, and in the south Atlantic and east Gulf states, the extreme northwest, the middle plateau region, and the middle Pacific coast about one-half the usual amount for April. The rainfall for the month was the heaviest ever noted for April during the respective periods of observation at stations in Louisiana, Texas, Ohio, Indiana, Wyoming, Colorado, Indian Territory, New Mexico, and Arizona, and was the least ever reported for April at stations in Minnesota, South Dakota, Montana, southern California, and eastern Washington.

On the 8th destructive local storms occurred in Illinois, Ohio, Iowa, and Michigan; well-defined tornadoes occurred in Huron, Medina, and Summit counties, Ohio; wind storms prevailed from the upper Mississippi river to the Rocky Mountains; and heavy gales were reported on the lower lakes. On the 9th severe storms swept over portions of Virginia, western Pennsylvania, the south Atlantic and east Gulf states, and the Lake region. Reports of the 24th to 26th state that large tracts of country from central Texas into Indian Territory were under water as the result of excessively heavy rains. Destructive hail storms were reported at Roberts and Prophetstown, Ill., on the 8th; in the northern part of Champaign county, Ill., on the 13th; at Abilene, Tex., on the 24th; at Memphis, Tenn., on the 26th; and at Baltimore, Md., on the 27th.

ATMOSPHERIC PRESSURE (expressed in inches and hundredths).

The distribution of mean atmospheric pressure for April, 1890, as determined from observations taken daily at 8 a. m. and 8 p. m. (75th meridian time), is shown on chart ii by isobars. The departure of the mean pressure for April, 1890, obtained from observations taken twice daily at the hours named from that determined from hourly observations, varied at the stations named below, as follows:

Station.	Departure.	Station.	Departure.
Eastport, Me	+ .013	Saint Louis, Mo	+ .001
Boston, Mass	+ .013	New Orleans, La	+ .002
New York City	+ .010	Saint Paul, Minn	+ .002
Philadelphia, Pa	+ .010	Galveston, Tex	+ .003
Washington City	+ .006	Dodge City, Kans	+ .013
Savannah, Ga	+ .004	Santa Fe, N. Mex	+ .013
Buffalo, N. Y	+ .005	Denver, Colo	+ .010
Detroit, Mich	+ .002	Salt Lake City, Utah	+ .009
Cincinnati, Ohio	+ .001	Portland, Oregon	+ .015
Memphis, Tenn	+ .004	San Francisco, Cal	+ .015
Chicago, Ill	+ .005	San Diego, Cal	+ .016

For April, 1890, the mean pressure was highest from Virginia southward over the south Atlantic states, Georgia, and the Florida Peninsula, where it was above 30.15, the highest mean reading, 30.18, being noted at Augusta and Savannah, Ga., and Titusville, Fla., respectively. The mean pressure was above 30.10 from the Lake region southward over the east Gulf states, and along the immediate Pacific coast north of the fortieth parallel. The mean pressure was lowest over the southwestern and western parts of the southern plateau region, where it fell to or below 29.90, the lowest mean value reported being 29.89, at Keeler, Cal. The mean pressure was below 29.95 over the Gulf of Saint Lawrence, and fell to or below 30.00 over a greater part of the plateau region south of the fortieth parallel, and in central Montana.

A comparison of the pressure chart for April with that of the

preceding month shows that there has been an increase in mean pressure east of the Mississippi River, and from the north Pacific coast eastward over the northern Rocky Mountain regions and thence southeastward to the west Gulf coast; elsewhere the mean pressure was lower than for March. The relative positions of the areas of highest and lowest mean pressure remained about the same, the pressure for each month being highest over the southeastern states and on the Pacific coast, and lowest over the Gulf of Saint Lawrence and the southern plateau region.

The mean pressure was above the normal over the entire country, save at Yuma, Ariz., and Calgary, N. W. T., where it was .01 and .02, respectively, below the normal. The greatest departures above the normal pressure were noted at stations along the Atlantic coast from New Hampshire to Georgia, and along the east shore of Lake Huron, where they equalled or exceeded .15, whence they decreased westward and northwestward to less than .05 on the Pacific coast and over the northern Rocky Mountain region.

BAROMETRIC RANGES.

The monthly barometric ranges at the several Signal Service stations are shown in the table of miscellaneous meteorological data. The general rule, to which the monthly barometric ranges over the United States are found to conform, is that they increase with the latitude and decrease slightly, though somewhat irregularly, with increasing longitude. In April, 1890, the monthly ranges were greatest in central and eastern New York, lower Michigan, and extreme northwestern Minnesota, where they equalled or exceeded 1.20, whence they decreased eastward to less than 1.00 over eastern Maine, southward to less than .40 over extreme southern Florida and the middle Gulf coast, southwest to less than .30 on the coast of southern California, and westward to less than .80 in the valley of the Columbia River. Along the Atlantic coast the

monthly ranges varied from .31 at Key West, Fla., to 1.21 at Albany, N. Y.; between the eighty-second and ninety-second meridians, .38 at New Orleans, La., to 1.26 at Lansing, Mich.; between the Mississippi River and the Rocky Mountains, .37 at Galveston, Tex., to 1.20 at Saint Vincent, Minn.; in the Rocky Mountain and plateau regions, .37 at Yuma, Ariz., to .91 at Boise City, Idaho; on the Pacific coast, .30 at Los Angeles and San Diego, Cal., to .91 at Port Angeles, Wash.

AREAS OF HIGH PRESSURE.

Six areas of high pressure were observed during the month of April, all of which reached the Atlantic or Gulf coasts. Four of these areas were first observed on the Pacific coast, and these, with one exception, were traced to the east of the Rocky Mountains north of the fiftieth parallel, the direction of movement to the west of the Rocky Mountains being slightly to the north of east, while the direction of movement east of the Rocky Mountains was generally to the south of east. Five of the areas of high pressure traced passed over the upper lake region, with one exception moving slightly to the south of east, while one area passing over that region moved directly from the Hudson Bay region to the south Atlantic coast. Although the number of areas of high pressure observed during April was less than the number traced during the preceding month they were more frequent on the Atlantic coast south of New York, five of the areas traced leaving the coast line between Cape May, N. J., and Jacksonville, Fla.

The following is a general description of the weather conditions attending each area of high pressure over the field of observation:

I.—The month opened with this area of high pressure central over Wisconsin, and it will be seen from the preceding REVIEW that it had its origin to the north of Montana on the 28th of March, its movement being retarded in that region until the close of the month, when it moved rapidly in a southeasterly direction, passing over the Lake region during the 1st, and including within its limits almost the entire country east of the Rocky Mountains. This progressive movement was attended by increasing pressure, the maximum readings of the barometer being observed on the middle Atlantic coast, when the centre was passing over that section on the morning of the 2d. It disappeared rapidly to the southeastward during the 2d and 3d, in advance of a storm which developed in the southwest.

II.—Appeared on the Pacific coast to the west of California on the 2d, and although not clearly defined, its movement can be traced northeastward from the telegraphic reports, the centre of greatest pressure being to the north of western Montana on the morning of the 3d and over Manitoba on the 4th. During its passage to the eastward of the Rocky Mountains, it extended southward over the eastern slope to Texas, although the centre of greatest pressure remained in high latitudes. It pursued a southeasterly course from Lake Superior to the south Atlantic coast, off which it was last observed on the 7th. As in the previous case the barometric pressure increased with the southeasterly movement of the area, the maximum pressure being observed when the centre of this area was passing over the Alleghanies. The barometric pressure was not so great as in the preceding case, and, although well defined, this area was less in extent and intensity than high area number i.

III.—First observed on the Pacific coast, and well to the southward, on the 7th. It moved to the north, following the coast line, the centre remaining to the westward, while the isobars bounding this area extended over the plateau regions, and on the morning of the 8th included the entire country from the Rocky Mountain regions westward to the Pacific coast, when the centre of greatest pressure was over western Oregon. At this point the northerly movement was interrupted, and during the 9th the area passed southeastward over the central plateau region, where it remained until the morning of the 10th, while a secondary area formed to the east of the Rocky Mountains and passed southeastward to the west Gulf coast, it being preceded by northerly gales, causing no

decided change in temperature, and attended by generally fair weather, only light showers occurring near the coast. The 8 p. m. telegraphic report of the 10th shows that this area of high pressure disappeared from the plateau region during that day, the barometric pressure declining .04 of an inch over Utah in twelve hours. Succeeding reports show, however, that the secondary area continued to move eastward, passing over the Gulf and south Atlantic states during the 11th and 12th attended by increasing pressure, the maximum being observed on the south Atlantic coast when the centre of greatest pressure was near to, and to the east of, the coast line. The pressure remained high over the south Atlantic states until the 13th, although it was decreasing slowly from the effects of an area of low pressure which was moving slowly eastward from the central Rocky Mountain region.

IV.—This area of high pressure appeared off the north Pacific coast on the 11th, immediately after the disappearance of that which covered the central plateau region on the 10th. It remained central near the Oregon coast during the 12th, after which it passed slightly to the north of east, and by the morning of the 13th its influence was felt as far to the eastward as Lake Superior. Telegraphic reports indicate that it probably received some re-enforcement from the region north of the stations of observation. On the morning of the 14th it was central over northern Minnesota, and apparently extended from the Saint Lawrence Valley westward to the Pacific coast. The centre moved eastward over the Lake region to Lake Huron, where it was located on the morning of the 15th, when the maximum pressure, 30.64, was observed at Saugeen, Ont. At this report the area of high pressure was elongated in an east and west direction, and extended from the Atlantic coast, north of Hatteras, N. C., westward to the Pacific. As it passed eastward from Lake Huron the direction changed to the southeast, and it passed over the middle Atlantic states on the 16th and 17th, and disappeared while central near the middle Atlantic coast on the 17th, apparently from a gradual decrease of pressure.

V.—The preceding area of high pressure was followed by the advance of this area from the Hudson Bay region over Lake Superior during the 17th. It moved slowly southward over the Lake region from the 18th to the 20th, during which time the telegraphic reports indicated the presence of a secondary area of high pressure in the region north of Montana. The southerly movement continued after the 20th, the centre of greatest pressure being located over Virginia on the morning of the 21st, when the secondary area of high pressure, previously referred to, had apparently united with the principal, which at that time covered the entire country east of the Rocky Mountains. On the morning of the 22d the states east of the Mississippi continued within the limits of this condition, the pressure being greatest over South Carolina, and on the 23d the states on the Atlantic coast still remained within its limits, the centre being to the south of Cape Hatteras, N. C. Reports received from the south Atlantic coast as late as the 25th indicated the presence of this area east of Florida.

VI.—First observed off the north Pacific coast on the 22d; it moved rapidly eastward to the northern Rocky Mountain regions on the 23d and to northern Minnesota on the 24th, when it extended from the Saint Lawrence Valley to the Pacific coast. On the morning of the 25th the barometric pressure had decreased within the limits of this area, which at that time was central over the upper lake region, while the telegraphic reports indicated that a secondary area had developed on the east slope of the Rocky Mountains to the north of Manitoba. The principal area of high pressure moved directly eastward over the Saint Lawrence Valley, and disappeared to the eastward of Nova Scotia on the 27th, while the secondary was apparently drawn southward by a storm which developed in Texas and moved northeastward over the Mississippi Valley and the lower lake region. It was central over Kansas on the afternoon of the 26th, over northern Texas on the morning of the 28th, and near the mouth of the Rio Grande River on the

29th, after which it was not sufficiently well-defined to be traced as an area of high pressure.

AREAS OF LOW PRESSURE.

Nine areas of low pressure were observed during the month, which is slightly less than the usual number observed during April. It will be seen from the preceding REVIEW that there has been a decided reduction in the number of areas of low pressure observed during the month of April as compared with those observed during the month of March. These disturbances usually originated in the region north of Montana, and after moving southeastward to the Lake region they changed course to the northeast, following the Saint Lawrence Valley. All the disturbances observed passed eastward over the meridian of the Mississippi Valley, and only one reached the Atlantic coast south of New York. They were most frequent over the upper lake region, eight of the depressions observed having been traced over this section, and in comparing chart number i with the same chart of the preceding REVIEW, it will be seen that the areas of low pressure during the month of April are slightly to the north of those observed during March.

The following is a general description of the weather conditions attending the movements of each barometric depression observed during the month and traced from the regular telegraphic reports of the Signal Service:

I.—The month opened with areas of low pressure covering the southern plateau region and the region north of Washington and Montana, while the eastern portion of the United States was within the limits of an extended area of high pressure. On the morning of the 2d the barometric trough attending the areas of low pressure referred to covered the entire Rocky Mountain regions, the areas of low pressure remaining in the extremities of this trough, one central over Texas and the other over Montana. These disturbances approached each other and united, forming a well-defined barometric depression, central in the lower Missouri valley on the morning of the 3d, after which the movement was to the eastward over the Lake region and Saint Lawrence Valley, the course being apparently a continuation of the course of the more southerly disturbance. This storm increased in intensity as it passed eastward, and its maximum energy was developed after passing to the east of New England, and when central in the vicinity of Sydney, C. B. I., where it was located on the morning of the 5th. It was followed by strong gales on the Atlantic coast as far south as Hatteras, N. C., the high winds continuing until the morning of the 5th, after the storm centre had passed far to the east of Newfoundland.

II.—Was first located as central over Colorado as a feeble disturbance on the 5th. It moved slowly eastward to the central Missouri valley on the 6th, after which it extended eastward; a secondary disturbance developed over the upper lake region and moved eastward over the lower lake region to the Saint Lawrence Valley during the 7th, while the principal disturbance could be no longer traced on the weather charts, its disappearance being due to the rapid advance of low area traced as number iii, which at that time was passing eastward north of Montana.

III.—This storm probably developed over the Pacific to the west of the state of Washington, where it was central on the 5th. It passed over British Columbia on the 6th, crossed the Rocky Mountains to the north of Montana on the night of the 6th, and reached Manitoba on the afternoon of the 7th. Although this disturbance was central to the north of Manitoba, its influence was felt as far south as central Texas, and from the Lake region westward to the Rocky Mountains. High southerly winds occurred over the eastern slope and in the upper Mississippi valley on the 7th, and these were followed by still stronger northwesterly winds on the 8th after the centre of disturbance had passed to the east of the Mississippi. The direction of movement changed from east to southeast when the centre reached the one-hundredth merid-

ian. On the morning of the 8th this depression was central over the southern portion of Lake Michigan, and it included within its limits the country from the Atlantic coast westward to the Rocky Mountains. The precipitation attending this disturbance was not excessive, except in a few localities in the Lake region and the upper Ohio valley. The southeasterly course continued until the afternoon of the 8th, when the lowest isobar bounding this disturbance included the states north of the Ohio River, the centre being located near Indianapolis, Ind. After this telegraphic report the direction of movement changed to the northeast, and the disturbance passed down the Saint Lawrence Valley with increasing energy, the minimum pressure, 29.16, being observed at Rockliffe, Ont., on the afternoon of the 9th, when the centre was near that point, and when easterly gales were reported in the Saint Lawrence Valley and on the New England and middle Atlantic coasts, and strong westerly gales were reported from the Lake region. The barometric pressure increased at the centre of this disturbance after the 9th as it passed northeastward over the Gulf of Saint Lawrence.

IV.—When the preceding disturbance was passing to the eastward over the Saint Lawrence Valley, the disturbance traced as number iv was approaching from the region north of Montana. It moved eastward to Manitoba, where it was central on the afternoon of the 10th, after which it moved directly southward to the Missouri Valley, assuming the shape of an elongated barometric trough, first extending east and west, and afterwards to the northeast and southwest over the eastern slope of the Rocky Mountains, and on the morning of the 12th two depressions were observed, one central over Wisconsin and the other over southern Kansas. The more easterly of these disturbances passed over the Lake region and disappeared, while that over Kansas moved westward to Colorado, after which the easterly course was resumed, the depression apparently skirting the southeastern quadrant of an advancing area of high pressure, but without developing any marked energy during its transit over the eastern portion of the United States, although the wind reached a maximum velocity of 40 miles at Boston, Mass., and 44 miles at Sandy Hook, N. J., but these winds were chiefly due to the advance of the attending area of high pressure. It disappeared to the east of Nova Scotia on the 15th, when northwesterly gales, attended by snow, were reported from the lower Saint Lawrence valley.

V.—Although the storm track on chart number i representing the course of this area gives the origin of this storm in northern Louisiana on the afternoon of the 16th, previous to that date, and as early as the 13th, a depression covered the southern plateau region and the Rio Grande Valley and remained in that section, gradually extending over the lower Rio Grande valley, until the 16th, when this depression formed over the lower Mississippi valley. This disturbance extended northward towards the Lake region, covering the Southern States and the Ohio Valley as a rain area, and passed off the middle Atlantic coast during the 18th, unattended by any marked atmospheric disturbance.

VI.—This disturbance was observed on the 16th, and was located in the northern extremity of the barometric trough within which the preceding area of low pressure developed. It moved southward from the Saskatchewan Valley to the upper Missouri valley where it was central on the 18th, after which it extended over the entire Rocky Mountain region, moving southward to New Mexico, where, on the 19th, a secondary disturbance developed to the southward over the Rio Grande Valley, while the principal area apparently moved to the central plateau region where it was located on the morning of the 20th, when areas of high pressure covered the country to the east and north of that region. After this date this disturbance followed the usual northeasterly course, reaching the upper Mississippi valley on the morning of the 22d, and the region north of Lake Superior on the morning of the 23d, and disappearing to the east of the Maritime Provinces on the 24th, when very severe northwesterly gales were reported from the

Gulf of Saint Lawrence, the current velocity at 8 a. m. of the 24th being sixty-eight miles per hour.

VII.—As in the case of low area number v, the development of this disturbance over Arkansas and the southwest was preceded by continued low pressure over the Rio Grande Valley during the preceding forty-eight hours, but the storm track of this disturbance, as given on chart number i, starts with the first clearly defined cyclonic movement of winds, and barometric depression with progressive movement, observed upon the weather chart. This storm apparently owes its origin to the advance of an area of high pressure southward over the eastern slope of the Rocky Mountains, the cold air moving to the westward of the barometric trough which extended over the lower Mississippi valley on the 25th was attended by northerly winds over Kansas and Texas, while warm southerly winds prevailed over the Southern States, and these conditions were followed by a rapid development of this storm, which passed over the Ohio Valley, the middle Atlantic states, and the north New England coast, where it was central on the morning of the 27th. During the transit of this storm rains prevailed generally throughout the country east of the Rocky Mountains, except in the Northwest, which continued generally under the influence of the area of high pressure. The rainfall

was especially heavy in the central Mississippi and Ohio valleys and the lower lake region.

VIII and IX.—This storm appeared in the region north of Montana on the 26th, when the preceding storm was passing eastward over the upper Ohio valley. It moved southeastward over the upper Missouri valley on the 27th, followed by high northwesterly winds in the Dakotas, and reached the upper lake region on the afternoon of the 28th, where its course changed to the eastward. The 8 a. m. weather chart of the 29th exhibits this as a well-defined depression central over Lake Huron, bounded by the isobars of 29.80, 29.90, and 30.00. The succeeding report of this day shows a northeasterly movement of this depression with an apparent decrease of energy, and its centre could not be located after the afternoon report of this date, probably owing to the advance of low area number ix which passed rapidly from the region north of Montana to Lake Superior during the night of the 28-29th. The presence of low area number ix in the vicinity of Lake Superior when the preceding one covered the Saint Lawrence Valley, caused a decrease of barometric gradient between these disturbances, which resulted in their uniting north of the Lake region, and at the close of the month low area number ix covered the upper Saint Lawrence valley.

Tabulated statement showing principal characteristics of areas of high and low pressure.

Barometer.	First observed.			Last observed.			Duration.	Velocity per hour.	Maximum abnormal changes in pressure in twelve hours, with maximum abnormal changes in temperature and maximum wind velocities in connection therewith.																										
	Date.	Lat. N.	Long. W.	Lat. N.	Long. W.	Rise.			Station.	Date.	Fall.	Station.	Date.	Miles per hour.	Direction.	Station.	Date.																		
High areas.		0	0	0	0	Days.	Miles.	Inch.																											
I.....	*28	54	117	37	72	6.0	20	.36	Denver, Colo.....	*31	31	0	Palestine, Tex.....	*31	42	nw.	Bismarck, N. Dak.....	*28	54	117	37	72	6.0	20	.36	Denver, Colo.....	*31	31	0	Palestine, Tex.....	*31	42	nw.	Bismarck, N. Dak.....	
II.....	2	44	128	30	77	4.5	36	.56	Pittsburgh, Pa.....	5	20	0	Duluth, Minn.....	3	52	n.	Sandy Hook, N. J.....	5	44	128	30	77	4.5	36	.56	Pittsburgh, Pa.....	5	20	0	Duluth, Minn.....	3	52	n.	Sandy Hook, N. J.....	
III.....	7	37	126	32	77	5.0	37	.73	Swift Current, N. W. T....	8	26	0	Cincinnati, Ohio.....	9	60	sw.	Winnemucca, Nev.....	7	37	126	32	77	5.0	37	.73	Swift Current, N. W. T....	8	26	0	Cincinnati, Ohio.....	9	60	sw.	Winnemucca, Nev.....	
IV.....	10	46	130	40	75	6.5	22	.72	Fort Sully, S. Dak.....	12	42	0	Calgary, N. W. T.....	10	52	no.	Rapid City, S. Dak.....	10	46	130	40	75	6.5	22	.72	Fort Sully, S. Dak.....	12	42	0	Calgary, N. W. T.....	10	52	no.	Rapid City, S. Dak.....	
V.....	17	55	89	30	75	6.5	13	.48	Swift Current, N. W. T....	18	39	0	Qu'Appelle, N. W. T....	18	44	s.	Chicago, Ill.....	17	55	89	30	75	6.5	13	.48	Swift Current, N. W. T....	18	39	0	Qu'Appelle, N. W. T....	18	44	s.	Moorhead, Minn.....	
VI.....	22	48	130	48	56	5.0	33	.54	Port Arthur, Ont.....	23	28	0	Saint Vincent, Minn.....	22	48	ne.	Block Island, R. I.....	22	48	130	48	56	5.0	33	.54	Port Arthur, Ont.....	23	28	0	Saint Vincent, Minn.....	22	48	ne.	Block Island, R. I.....	
VIa.....	25	53	103	25	97	4.0	24	.32	Qu'Appelle, N. W. T....	25	25	0	Abilene, Tex.....	24	48	n.	Abilene, Tex.....	25	53	103	25	97	4.0	24	.32	Qu'Appelle, N. W. T....	25	25	0	Abilene, Tex.....	24	48	n.	Abilene, Tex.....	
Mean.....		48	118	35	76	5.4	26	.53			30			49						48	118	35	76	5.4	26	.53			30			49			
Low areas.								Fall.			Rise.																								
I.....	2	32	97	43	59	3.0	40	.42	Des Moines, Iowa.....	3	30	0	Palestine, Tex.....	2	48	s.	Springfield, Ill.....	2	32	97	43	59	3.0	40	.42	Des Moines, Iowa.....	3	30	0	Palestine, Tex.....	2	48	s.	Springfield, Ill.....	
II.....	1	52	117	41	95	2.0	33	.38	Minneapolis, Minn.....	1	17	0	Minneapolis, Minn.....	1	36	sw.	Fort Assiniboine, Mont.	1	52	117	41	95	2.0	33	.38	Minneapolis, Minn.....	1	17	0	Minneapolis, Minn.....	1	36	sw.	Fort Assiniboine, Mont.	
III.....	5	43	106	49	53	3.0	40	.46	Port Arthur, Ont.....	5	21	0	Cleveland, Ohio.....	6	42	nw.	Sandy Hook, N. J.....	5	43	106	49	53	3.0	40	.46	Port Arthur, Ont.....	5	21	0	Cleveland, Ohio.....	6	42	nw.	Sandy Hook, N. J.....	
IV.....	9	36	115	48	68	5.0	33	.54	Calgary, N. W. T.....	6	17	0	Swift Current, N. W. T....	6	52	w.	Columbus, Ohio.....	9	36	115	48	68	5.0	33	.54	Calgary, N. W. T.....	6	17	0	Swift Current, N. W. T....	6	52	w.	Columbus, Ohio.....	
V.....	16	33	93	39	71	1.5	41	.30	Milwaukee, Wis.....	8	25	0	Moorhead, Minn.....	8	52	sw.	Buffalo, N. Y.....	16	33	93	39	71	1.5	41	.30	Milwaukee, Wis.....	8	25	0	Moorhead, Minn.....	8	52	sw.	Buffalo, N. Y.....	
VI.....	16	55	117	52	69	7.5	24	.30	Norfolk, Va.....	9	25	0	Atlanta, Ga.....	10	64	w.	Fort Assiniboine, Mont.	16	55	117	52	69	7.5	24	.30	Norfolk, Va.....	9	25	0	Atlanta, Ga.....	10	64	w.	Fort Assiniboine, Mont.	
VII.....	26	37	90	48	57	2.0	44	.40	Calgary, N. W. T.....	17	13	0	Helena, Mont.....	16	68	nw.	Sandy Hook, N. J.....	26	37	90	48	57	2.0	44	.40	Calgary, N. W. T.....	17	13	0	Helena, Mont.....	16	68	nw.	Sandy Hook, N. J.....	
VIII.....	26	53	117	46	76	2.0	34	.40	Port Arthur, Ont.....	20	21	0	Abilene, Tex.....	25	42	sw.	Anticosti Island, G. of S. L.	26	53	117	46	76	2.0	34	.40	Port Arthur, Ont.....	20	21	0	Abilene, Tex.....	25	42	sw.	Anticosti Island, G. of S. L.	
IX.....	26	55	118	47	75	2.0	48	.40	Milwaukee, Wis.....	27	21	0	Qu'Appelle, N. W. T....	26	44	nw.	Corpus Christi, Tex.....	26	55	118	47	75	2.0	48	.40	Milwaukee, Wis.....	27	21	0	Qu'Appelle, N. W. T....	26	44	nw.	Fort Buford, N. Dak.....	
								.44	Calgary, N. W. T.....	28	17	0	Swift Current, N. W. T....	28	46	sw.	Chicago, Ill.....								.44	Calgary, N. W. T.....	28	17	0	Swift Current, N. W. T....	28	46	sw.	Chicago, Ill.....	
									Duluth, Minn.....	29	23	0																							
Mean.....		46	110	46	68	3.3	37	.41			30			45						46	110	46	68	3.3	37	.41			30			45			

* March.

NORTH ATLANTIC STORMS FOR APRIL, 1890 (pressure in inches and millimetres; wind-force by Beaufort scale).

The paths of the depressions that appeared over the north Atlantic Ocean during April, 1890, are shown on chart i. These paths have been determined from international simultaneous observations by captains of ocean steamships and sailing vessels received through the co-operation of the Hydrographic Office, Navy Department, and the "New York Herald Weather Service."

Twelve depressions have been traced for April, 1890, the average number traced for the corresponding month of the last seven years being nine. The greatest number of depressions previously traced for April was thirteen, in 1886, and the least number was six, in 1883. Of the depressions traced for the current month, four were continuations of areas of low

pressure which first appeared over the North American continent; one was a continuation of depression number 10 for March, and was the storm traced and described as low area xi, within whose area the destructive tornadoes of March 27th occurred in the Ohio and middle Mississippi valleys; two apparently developed southeast of the Grand Banks; one first appeared south of Nova Scotia; two were first located west or southwest of the British Isles; and one advanced over mid-ocean in high latitudes. The depressions which advanced from the western Atlantic passed north of the region of observation before reaching the British Isles, and no storm-centres were located south of the thirty-fifth parallel.

The movements of areas of high pressure during the month were as follows: on the 2d an area of high pressure occupied

the middle Atlantic states, whence it had advanced from the upper lake region; on the 3d it occupied the ocean between the coast and Bermuda; on the 4th it was central over and northeast of Bermuda; and on the 5th it extended from south of the Grand Banks eastward to south of the Azores. During the 5th and 6th an area of high pressure moved from the upper Mississippi valley and the Lake region to the middle and south Atlantic coasts; on the 7th it occupied the ocean between the south Atlantic coast and Bermuda; and by the 8th had advanced eastward and was central over the Azores. From the 8th to the 11th the pressure continued high from the Grand Banks to the European coast south of the fiftieth parallel, and on the latter-named date an area of high pressure was central off the south Atlantic coast, whence it had advanced eastward over the Gulf States. By the 13th the area of high pressure which had extended eastward from the Grand Banks had contracted and occupied the ocean between the Banks of Newfoundland and the Azores, and the pressure continued high over the south Atlantic states. The relative positions of these areas of high pressure remained materially unchanged during the next three days, after which they apparently drifted to the southward and eastward. On the 16th an area of high pressure extended from the Lake region over New England and the northern part of the middle Atlantic states; on the 17th this area occupied but a limited area over the middle Atlantic states; and by the 18th it had disappeared by a decrease of pressure. On the 21st an area of high pressure extended from the lower lake region southward over the Atlantic coast states; on the 22d the pressure was highest over the south Atlantic states; by the 24th the area extended from the south Atlantic states northeastward to Newfoundland and eastward to the Azores; by the 25th this extensive area of high pressure had been divided by the development of a storm of limited area over the southern part of the Grand Banks, and the appearance of a slight depression on the middle Atlantic coast. On the 25th the pressure was high along and off the Atlantic coast and from Bermuda to the Azores. On the 27th the pressure was high from the Canadian Maritime Provinces southward; and by the 29th this area of high pressure had moved east and southeast to the Azores; whence it extended northwest to Newfoundland and westward to Bermuda by the 30th.

Compared with the corresponding month of the last seven years the depressions traced for the current month were in excess of the average number for April, and although unsettled and stormy weather prevailed throughout a greater part of the month, more especially over the western and eastern parts of the ocean, the gales reported were not unusually severe for the season.

Over the western part of the ocean the storm periods were the 1st and 2d, 5th to 9th, 11th to 16th, 18th, 19th, 25th, 26th, and 28th, the severest storms of the month occurring northeast of the Grand Banks on the 2d, and from the Gulf of Saint Lawrence eastward over Newfoundland and the Grand Banks from the 5th to 9th. Over mid-ocean the weather was stormy from the 1st to 5th, 17th to 20th, and 27th to 29th, the heaviest storms being noted on the 1st, 3d, 5th, 17th, 20th, and 27th. Over the eastern part of the ocean stormy weather prevailed on the 2d, 6th to 8th, 11th to 18th, 21st, 22d, 25th, 29th, and 30th, the principal storms of the month being noted southwest and west of the British Isles from the 11th to the 18th.

The following are brief descriptions of the depressions traced for April, 1890:

1.—This depression was a continuation of a storm which appeared on the north Pacific coast on March 25th, whence it moved southeastward to Colorado, and thence eastward over the middle Mississippi and Ohio valleys, the lower lake region, New York, and New England, and thence over Newfoundland to mid-ocean by the close of the month. The passage of this storm over the middle Mississippi and lower Ohio valleys during March 27th was attended by terrific and disastrous tornadoes. On April 1st the depression was central over mid-ocean in about N. 55°, with central pressure below 29.50 (749) and

heavy gales, whence it passed northeastward beyond the region of observation.

2.—This depression apparently developed south of Nova Scotia during the 1st, and moved thence to the northeast of the Grand Banks by the 2d, and to mid-ocean in about N. 55° by the 3d, after which it disappeared north of the region of observation. On the 2d pressure falling to about 29.40 (747) was reported over the northern part of the Grand Banks, and heavy gales prevailed in that region. On the 3d the pressure was below 29.50 (749), and fresh gales prevailed over mid-ocean.

3.—This depression first appeared southeast of the Banks of Newfoundland on the 4th, and passing thence rapidly northeastward disappeared beyond the region of observation after the 5th, without evidence of marked energy.

4.—This depression was a continuation of low area i, which passed eastward from the Gulf of Saint Lawrence during the 5th. By the 6th the storm was central south of Newfoundland, with pressure below 29.30 (744) and strong to whole gales over and near the Grand Banks. By the 7th the centre of depression moved northeastward to about the fiftieth parallel, with an apparent decrease of energy, after which it passed beyond the region of observation.

5.—This depression was a continuation of low area ii, which advanced eastward over New England and Nova Scotia during the 7th and on the morning of the 8th was central south of Newfoundland, with pressure falling to about 29.45 (748) and fresh to strong gales. By the 9th the storm-centre had apparently passed northeastward beyond the region of observation.

6.—This depression advanced to south of Nova Scotia, where it was central on the 11th, with pressure about 29.60 (752) and fresh gales, and where it remained nearly stationary until the 14th, without evidence of marked energy, after which it moved northeast to the south of Newfoundland by the 15th, where it was attended by strong gales, and thence to the north of the Grand Banks by the 16th, where a marked decrease in pressure and increase in energy were shown. During the 17th and 18th the depression moved eastward to about the twenty-second meridian, after which latter date it passed northward and probably united with depression number 10 which had advanced eastward into high latitudes. The irregular movements of this depression from the 11th to 14th were evidently due to the presence of an area of high pressure to the eastward of its position whereby its advance was obstructed. With the southeastward movement of this area of high pressure the storm-centre moved northeastward along the usual path of storms.

7.—The presence of an area of low pressure west of the British Isles was indicated by reports of the 12th, and on the 13th a well-defined storm was central southwest of Ireland, with central pressure falling to about 29.30 (744) and fresh to strong gales; by the 14th the depression had apparently moved southeastward into the Bay of Biscay, where pressure falling below 29.00 (737) and heavy gales were indicated. During the 15th and 16th the storm was apparently central over or east of the Bay of Biscay, attended by strong gales, after which it passed beyond the region of observation.

8.—This depression apparently developed southwest of the British Isles on the 17th, and thence moved eastward over the Bay of Biscay in the wake of depression number 7, with central pressure about 29.50 (749) and strong gales.

9.—This depression was a continuation of low area v, which passed off the middle Atlantic coast during the night of the 17-18th, and on the morning of the 18th was central northwest of Bermuda, with pressure falling to about 29.70 (754) and fresh gales. By the 19th the centre of depression had moved to the southeast of the Grand Banks, with a marked decrease in pressure and increase of energy. By the 20th it had advanced northeastward to the thirtieth parallel, with an apparent increase of strength, after which it passed rapidly northeastward and disappeared north of the British Isles.

10.—This depression was central on the 19th over mid-ocean north of the fifty-fifth parallel, whence it had apparently advanced from the westward. The depression possessed con-

siderable energy, but it was too far north to admit of plotting its path after the 19th with reports at hand.

11.—This depression apparently originated over or near the Grand Banks on the 25th, on which date pressure falling to about 29.80 (757) and fresh to strong gales were reported in that region. By the 26th the depression had changed its position but slightly, after which it moved rapidly northeastward with a marked increase in strength, and disappeared in the direction of Iceland after the 27th. A peculiarity of this depression was that it apparently developed within an area of high pressure which on the 24th extended from the Canadian Maritime Provinces to the Azores, and within the central part of which this depression had developed by the 25th, on which date a storm area of small diameter on the southeast edge of the Grand Banks was surrounded by high pressure.

12.—This depression was a continuation of low area vii, which passed north of east over the Gulf of Saint Lawrence during the 28th, with pressure about 29.60 (752) and fresh gales. By the 29th the depression had advanced east-northeast to the fortieth meridian, and thence passed eastward to the twentieth meridian by the 30th, with central pressure about 29.60 (752) and moderate to fresh gales.

OCEAN ICE IN APRIL.

The following table shows the southern and eastern limits of the region within which icebergs or field ice were reported for April, during the last eight years:

Southern limit.			Eastern limit.		
Month.	Lat. N.	Long. W.	Month.	Lat. N.	Long. W.
April, 1883	40 49	52 06	April, 1883	45 00	43 00
April, 1884	41 25	48 46	April, 1884	45 25	43 34
April, 1885	41 40	49 50	April, 1885	44 10	39 41
April, 1886	40 51	46 39	April, 1886	47 43	30 11
April, 1887	40 02	50 04	April, 1887	48 00	38 18
April, 1888	41 33	50 00	April, 1888	47 40	49 00
April, 1889	43 57	50 20	April, 1889	47 16	43 11
April, 1890	40 40	49 40	April, 1890	47 26	35 42

* Isolated iceberg.

Ice was reported about one degree south and about five degrees east of the average southern and eastern limits of Arctic ice for April. The southernmost ice reported was a large iceberg on the 1st, and the easternmost ice noted was two large icebergs on the 5th, in the positions given in the table. In but one year, 1887, has ice been reported farther south, and in but one year, 1886, has ice been reported farther east than for the current month. During the last decade of the month large quantities of field ice from the Gulf of Saint Lawrence seriously obstructed navigation from Cape Breton Island and the eastern coast of Nova Scotia to southern Newfoundland ports. Compared with the preceding month the southern limit of ice has been extended less than one degree, and the eastern limit about four degrees. Compared with the corresponding month of preceding years the aggregate quantity of ice reported for the current month was largely in excess of the average, and the area occupied by heavy icefields was larger than noted for April during the past seven years. The enormous quantity of ice along or near the trans-Atlantic steamship routes between the thirty-fifth and fifty-second meridians caused considerable delay and damage to shipping.

The following positions of icebergs and field ice reported for April, 1890, are shown on chart i by ruled shading:

1st.—N. 45° 17', W. 43° 44' to N. 44° 54', W. 44° 26', twenty-two bergs, ranging from forty to sixty feet high and one hundred to two hundred and fifty feet long; N. 42° 04', W. 50° 28', berg; passed field ice an hour later; N. 44° 48', W. 45° 10', four large flat bergs; N. 42° 42', W. 50° 24', a medium sized and three small bergs; N. 44° 35', W. 40° 50', three large bergs, many small bergs, and pieces of ice; N. 42° 57', W. 49° 51', moderate sized berg; N. 45° 17', W. 43° 30' to N. 45° 03', W. 44° 18', forty-nine bergs; N. 42° 40', W. 50° 36', berg; N. 44° 51', W. 45° 15', large berg; N. 40° 40', W. 49° 40', large berg.

2d.—N. 43° 55', W. 49° 02', large berg; N. 45° 14', W. 41° 50', three small bergs and floating ice; N. 44° 25', W. 40° 50', four bergs; N. 47° 20', W. 38° 30', flat berg, thirty feet high and one-quarter of a mile long; also a very large berg; N. 47° 26', W. 38° 38', two peaked bergs; N. 44° 56', W. 44° 25' to N. 45° 17', W. 43° 48', fifty-nine bergs, three of them being nearly a mile long and flat on top, the others smaller; N. 44° 58', W. 42° 31', five bergs and small pieces.

3d.—N. 42° 18', W. 50° 48', large berg; also three pieces of ice; N. 45° 02', W. 41°, seventeen bergs; N. 45° 12', W. 41° 58' to N. 45° 02', W. 42° 20', two bergs; N. 43° 47', W. 49° 26', three large bergs; N. 43° 28', W. 51° 04', large berg; N. 48°, W. 36°, nine bergs; a little to the southward and westward five smaller ones, and three very large bergs standing very high out of the water; N. 45° 13', W. 42° 54', large berg, with three pinnacles; N. 45°, W. 41°, seventeen bergs within twenty miles; N. 43° 10', W. 48° 07', small flat berg; N. 43° 51', W. 47° 22', large berg, with pinnacles at ends.

3d-4th.—N. 45° 12', W. 44° 35' to N. 44° 53', W. 45° 46', five bergs; N. 42° 50', W. 51° 05', three small bergs.

4th.—N. 44° 55', W. 42° 37' to N. 44° 51', W. 42° 45', two bergs; N. 42° 25', W. 50° 40', small low berg; N. 45° 23', W. 40° 50', large berg and several pieces of ice; N. 44° 49', W. 42° 16', two large and two small bergs; N. 43° 47', W. 47° 10', large berg; and to the westward a large berg a quarter of a mile long, also four smaller bergs and floes; N. 47° 12', W. 36° 12', four large and two small bergs; N. 47°, W. 39° 50' to N. 46° 20', W. 40° 10', twenty-five large and moderate sized bergs and pieces of ice; N. 42°, W. 49°, berg; N. 46° 01', W. 40° 09', seven medium bergs and detached pieces; N. 46° 34', W. 40°, large flat-topped bergs; N. 47° 06', W. 42°, twenty-three bergs; N. 45° 20' W. 44° 10' to N. 47° 30', W. 39° 58', forty-three bergs.

5th.—N. 42° 26', W. 51° 05', medium berg; N. 45° 23', W. 41° 36' to N. 45° 03', W. 42° 34', twenty-four bergs and pieces of ice; N. 42° 20', W. 51° 37', berg and field ice; N. 45°, W. 41° 50', two large bergs, one of them a mile long, and two small ones; N. 47° 30', W. 38° 46', one large and one small berg and pieces of ice; and sailing on a s. 50° w. course passed about forty bergs in eighty-six miles; N. 44° 18', W. 38° 30', three small bergs; N. 47° 26', W. 35° 42', two bergs; N. 47° 18', W. 36° 02', large berg; N. 43° 10', W. 37° 50', large berg; N. 46° 20', W. 54° 02', three large bergs.

6th.—N. 42° 40', W. 49° 48', small berg; N. 42° 35', W. 50° 55', large berg; N. 43° 22', W. 49° 04', several medium bergs and field ice; N. 42° 45', W. 50°, large berg; N. 45° 46', W. 41° 43' to N. 45° 30', W. 42° 03', six large bergs; N. 44° 40', W. 44° 10', large berg; N. 45° 46', W. 40° 35', large berg, and two smaller ones; N. 45° 35', W. 41° 15', very large berg; N. 44° 56', W. 41° 41', an enormous flat-topped berg over two miles long; N. 45° 35', W. 41° 50' to N. 46° 31', W. 38° 22', twenty-two bergs and many pieces of ice; N. 44° 36', W. 44° 03' to N. 46° 08', W. 39° 47', one small and four large bergs.

8th.—N. 42° 45', W. 50° 05', berg; N. 42° 44', W. 51° 28', berg; N. 42° 48', W. 50° 02', a large berg; N. 45° 20', W. 40° 11', large berg; N. 45° 32', W. 44° 02', large berg; N. 46° 50', W. 38° 04', large berg; N. 45°, W. 40° 20', berg.

9th.—N. 47° 34', W. 39° 36', large berg, also a small one; N. 45° 03', W. 40°, large berg.

10th.—N. 44° 52', W. 43° 47', a large flat-topped berg; N. 44° 50', W. 44° 10', berg; N. 45°, W. 39° 42', three bergs; N. 44° 57', W. 39° 50', very large berg and two small ones; N. 47°, W. 38°, large berg; N. 44° 10', W. 48° 30', three large bergs; N. 43° 40', W. 55°, small berg; N. 46° 34', W. 56° 09', ice fields and small bergs in sight for several hours; N. 45° 50', W. 42°, medium size berg; N. 47° 15', W. 36° 25', two large bergs and several pieces.

10-12th.—N. 47° 23', W. 38° 30', a large berg; N. 45° 10', W. 43° 20', large berg.

11th.—N. 47° 03', W. 38° 02', two small bergs; N. 47° 05', W. 38° 16', small berg and several pieces of ice; N. 46° 26', W. 42° 55', berg.

12th.—N. 42° 13', W. 55° 02', berg; N. 47° 05', W. 45° 35', very large berg; N. 46° 12', W. 44° 24', small berg; N. 44° 29', W. 40° 10', large berg; N. 46° 04', W. 37° 35', berg; N. 47° 27', W. 37° 27', two bergs.

13th.—N. 44° 17', W. 40° 35', large berg; N. 45° 27', W. 44° 56', large berg.

14th.—N. 43° 39', W. 45°, three large bergs; N. 44°, W. 40° 19', large berg. N. 46° 39', W. 38° 48', four bergs and pieces.

15th.—N. 48° 48', W. 42° 17' to N. 48° 30', W. 44° 17', two large and two medium bergs and pieces of ice; N. 46° 36', W. 41° 24', a very large flat-topped berg and several pieces; N. 43° 43', W. 39° 32', large berg; N. 42°, W. 38° 25', bergs; N. 45° 20', W. 37° 30', bergs; N. 51° 10', W. 40° 05', bergs; N. 46° 10', W. 43°, bergs; N. 45° 50', W. 48°, bergs.

16th.—N. 45° 02', W. 52° 05', pieces of ice; N. 43° 41', W. 39° 30', two small bergs; N. 46° 57', W. 41° 20', six bergs within thirty miles.

17th.—N. 43° 20', W. 49° 01', small berg and pieces; N. 43° 08', W. 50° 59', large berg with two very high peaks; N. 47°, W. 41° 35', large berg; N. 45° 30', W. 52°, bergs.

17-18th.—N. 50° 20', W. 37° 05' to N. 49° 06', W. 44° 14', seven large bergs; N. 47° 30', W. 40°, large berg; N. 47°, W. 43°, large berg and small pieces.

18th.—N. 43° 16', W. 49° 16', small berg and a piece of ice; N. 46° 31', W. 41° 35', large berg with small peaks; N. 42° 40', W. 50° 25', berg with four high peaks; N. 44° 30', W. 53° 30', bergs; N. 52° 05', W. 41° 05', bergs.

19th.—N. 43°, W. 50° 10', bergs; N. 43° 20', W. 48°, two small bergs; N. 48° 27', W. 45° 35' to N. 47° 54', W. 47° 45', field ice and numerous bergs.

20th.—N. 44° 28', W. 43° 33', small berg; N. 45° 20', W. 59° 10', field ice; N. 46° 35', W. 43° 08', two bergs; N. 47° 20', W. 39° 55', berg.

21st.—N. 43° 34', W. 49° 06' to N. 43° 22', W. 50° 36', small bergs; N. 43° 20', W. 51° 02', large flat-topped berg and a very large berg with two peaks, and some lumps of ice; N. 44° 15', W. 45° 10', large berg; N. 51° 22', W. 43° 32', berg; N. 45° 50', W. 45° 26', large berg; N. 47° 02', W. 58° 43', large field of broken ice; Cape Ray bearing east, six miles, another very large field of ice; after the first fifteen miles, ice grew much thicker and more closely packed and rafted; communicated with a steam sealer, which reported ice as far as could be seen from aloft; 24th, failed to make further progress and returned to open water; while cruising off Cape Ray, found the ice breaking up fast and drifting southeasterly; 27th, steered west from Cape Ray through broken and loose ice; entered clear water, Saint Paul's bearing southwest by south, eighteen miles.

21st-22d.—N. 45° 28', W. 42° 31' to N. 45° 59', W. 41° 25', bergs and detached pieces of ice.

22d.—N. 43° 05', W. 49° 41', block of ice 20 feet high and 60 feet long, and several pieces of ice; N. 44° 37', W. 49° 45', small pieces of ice; N. 49° 28', W. 39° 37', large berg; N. 49° 12', W. 40° 29', large and small bergs; N. 46° 10', W. 41° 20' to N. 46° 35', W. 40° 32', thirty bergs and quantity of pieces; N. 45° 15', W. 39° 55', bergs; N. 43°, W. 50° 45', bergs.

23d.—N. 49° 33', W. 38° 52', berg; N. 49° 10', W. 40° 15', berg; N. 47° 44', W. 47° 31', drift ice and small bergs; N. 45°, W. 40°, five bergs; N. 46° 26', W. 40° 50', large and small bergs. The ice at Cape Rouge is moving out of the Saint Lawrence River. A telegram from Quebec stated that the steamer "Lake Nepigon" was fast in the ice off Cape Ray, N. F.; N. 45° 15', W. 40° 25' to N. 45° 08', W. 40° 47', four bergs; N. 45° 03', W. 40° 14', several bergs; N. 45° 14', W. 40° 19' to N. 44° 56', W. 41° 09', ten large and several small bergs; N. 48° 32', W. 49° 10', field ice; N. 46° 26', W. 40° 50', one large and several small bergs.

24th.—N. 45° 20', W. 39° 52', field ice and one large and several small bergs; N. 44° 50', W. 40° 42', two large bergs, 1,500 feet long, 50 feet high, flat on top; N. 45° 22', W. 40° 21', four bergs; N. 45° 16', W. 40° 30', three large bergs; N. 45° 14', W. 40° 19' to N. 44° 56', W. 41° 09', ten large and

several small bergs; N. 45° 07', W. 40° 06' to N. 44° 38', W. 41° 02', twenty-seven bergs; N. 48° 09', W. 42° 42', berg; N. 47° 33', W. 44° 36', three bergs; N. 47°, W. 45° 16', berg; N. 47° 20', W. 39° 55', berg.

25th.—N. 45° 25', W. 58°, field ice; N. 47° 48', W. 39° 57', large berg; N. 45° 19', W. 40° 17', three large bergs, one nearly a mile long; N. 42° 30', W. 49° 20', several pieces of ice; N. 47° 44', W. 39° 13' to N. 47° 31', W. 39° 43', twelve large bergs and pieces of ice; N. 46° 52', W. 40° 50', large berg; N. 43° 01', W. 50° 49', two very large bergs; N. 42° 48', W. 48° 04', small berg. The bark "Maitland," from Buenos Ayres for Sydney, C. B. I., was prevented from getting within fifty miles of Sydney by ice, and had to put in at Halifax, N. S.; N. 46° 15', W. 42° 42', large berg; N. 44° 30', W. 52°, bergs.

26th.—N. 42° 13', W. 50° 37', two bergs; N. 45° 10', W. 39° 27', berg; N. 45° 16', W. 39° 52', berg; N. 45° 21', W. 39° 37', berg; N. 45° 30', W. 39° 30', four bergs; N. 44° 20', W. 41°, berg; N. 46° 16', W. 41° 15', very large berg; N. 42° 22', W. 50° 06', berg; N. 42° 17', W. 49° 58', two small bergs.

27th.—N. 42° 47', W. 51° 30' to N. 42° 47', W. 51° 57', two large bergs; N. 44° 36', W. 40° 38', berg; N. 47° 07', W. 60°, field ice; N. 43° 33', W. 49° 35', large berg; N. 43° 19', W. 49° 48', large berg; N. 44° 02', W. 41°, very large berg; N. 44° 20', W. 41°, berg; N. 46°, W. 44° 56', large quantity of field ice; N. 45° 19', W. 39° 04', berg; N. 45° 22', W. 38° 50', three bergs; N. 44° 30', W. 61°, field ice.

28th.—N. 45° 18', W. 38° 16' to N. 45°, W. 39° 10', thirty bergs; off Cape George, loose field ice extending about four miles southwest; N. 47° 06', W. 58° 40' to Cape Ray, field ice; N. 44°, W. 40° to N. 45°, W. 39°, thirty-five bergs.

29th.—N. 44° 51', W. 38° 42', small and large bergs; N. 45° 14', W. 39°, berg; at entrance of the Gulf of Saint Lawrence from W. 58° to W. 60° 20', very large field of ice; N. 45° 28', W. 38° 35', low berg.

30th.—N. 46° 52', W. 36° 55', large berg; N. 42° 13', W. 52° 38', large berg.

FOG IN APRIL.

The following are limits of fog-areas on the north Atlantic Ocean, west of the fortieth meridian, for April, 1890, as reported by shipmasters:

Date.	Entered.			Cleared.			Date.	Entered.			Cleared.		
	Lat.	N.	Lon. W.	Lat.	N.	Lon. W.		Lat.	N.	Lon. W.	Lat.	N.	Lon. W.
5	41	40	49 25	41	35	49 40	14-15	43 00	48 30	42 40	49 50		
5	39 52	71 04	39 47	71 17	15	40 45		64 35	40 35	67 05			
5	40 36	64 56	40 36	65 25	24	40 32		70 35	40 25	72 15			
5	44 20	45 12	44 10	45 50	25	40 57	63 00	40 46	64 30				
5	42 17	52 40	42 17	53 30	25	47 48	42 40	47 18	44 45				
9	41 00	66 22	40 25	69 29	25	40 32	71 52	40 31	73 12				
9-10	41 40	61 20	41 33	63 57	25-26	43 01	48 10	42 22	49 49				
10-11	45 58	56 34	43 15	57 45		42 49	50 58	42 24	51 30				
10-11	41 48	57 20	41 10	63 24		45 00	44 34	43 56	46 36				
11	42 11	48 53	41 24	52 31	27	41 58	60 40	41 44	62 27				
12	41 14	56 50	41 06	58 15	27	40 43	67 22	40 28	73 14				
12	41 00	48 57	40 37	49 36	28	42 00	50 00	42 00	50 30				
13	40 57	60 57	40 48	63 12	28	40 57	65 46	40 49	66 39				
13-14	44 13	43 04	43 36	44 55	28	42 19	57 50	42 08	59 56				
14	41 25	52 04	41 30	49 00	30	40 28	68 57	40 14	70 52				
14	40 24	62 19	40 62	69 44	30	42 50	47 10	42 30	48 00				

The limits of fog belts west of the fortieth meridian are shown on chart i by dotted shading. In the vicinity of the Banks of Newfoundland fog was reported on eleven dates; between the fifty-fifth and sixty-fifth meridians on eleven dates; and west of the sixty-fifth meridian on nine dates. Compared with the corresponding month of the last two years the dates of occurrence of fog near the Banks of Newfoundland were nine less than the average; between the fifty-fifth and sixty-fifth meridians one less than the average; and west of the sixty-fifth meridian five less than the average. In each instance fog was reported in the regions referred to attending the approach or passage to the northward of low pressure storms. On the 9th dense fog was reported along the coast

from Massachusetts to Philadelphia, Pa., with the passage of a low pressure storm of pronounced strength from the Lake region to the Saint Lawrence Valley, and on the 27th dense

fog prevailed from Massachusetts southward along the middle Atlantic coast with the passage of a low pressure storm from Pennsylvania east-northeast over New York and New England.

TEMPERATURE OF THE AIR (expressed in degrees, Fahrenheit).

The distribution of mean temperature over the United States and Canada for April, 1890, is exhibited on chart ii by dotted isotherms. In the table of miscellaneous meteorological data the monthly mean temperature and the departure from the normal are given for regular stations of the Signal Service. The figures opposite the names of the geographical districts in the columns for mean temperature and departure from the normal show, respectively, the averages for the several districts. The normal for any district may be found by adding the departure to the current mean when the departure is below the normal and subtracting when above. The monthly mean temperature for regular stations of the Signal Service represents the mean of the maximum and minimum temperatures.

The mean temperature for April, 1890, was highest in extreme southern Florida and in the lower Rio Grande valley, where it was above 75°, and the mean values were above 70° over the Florida Peninsula, along the immediate Gulf coast from the Mississippi River to Galveston, Tex., in the Rio Grande Valley east of the one hundred and fourth meridian, in the lower Gila valley, Arizona, and in the valley of the Colorado River northward to extreme southern Nevada. The mean readings were above 60° south of a line traced from east-central North Carolina irregularly westward to the southern part of the Panhandle of Texas, thence southwestward to southeastern New Mexico, thence westward to southeastern Arizona, and thence northwest to the lower valley of the San Joaquin River, California, in the interior of southern California, save along the immediate coast, and at Sacramento, Cal. The mean temperature was lowest at the more elevated stations in west-central Colorado, where it fell below 30°, and the mean values were below 35° in the lower Saint Lawrence valley, along the west coast of the Gulf of Saint Lawrence, and at stations on the north shore of Lake Superior. The mean readings were below 40° north of a line traced from extreme southeastern Maine irregularly westward to central lower Michigan, thence northwestward to southern Manitoba, and thence north of west over the British Possessions north of Montana. The mean temperature also fell below 40° in western Wyoming and the adjacent part of Idaho, in south-central Utah, and east-central Nevada.

The mean temperature was above the normal, save in parts of eastern New England and the Canadian Maritime Provinces, in the Florida Peninsula, from the Rio Grande Valley northeastward to extreme western Tennessee and northward to eastern Colorado, along the immediate south and middle Pacific coasts, from the north Pacific coast and the Columbia Valley northeastward over the British Possessions north of Montana, and at Chicago, Ill. The greatest departures above the normal temperature were noted on the coast of east-central North Carolina, and within an area extending from Saint Vincent, Minn., to Bismarck, N. Dak., where they exceeded 5°, and the departures above the normal temperature were more than 3° within an area extending from central Pennsylvania to northeastern West Virginia, in north-central Ontario, from west-central Ohio westward to central Illinois, in northern upper Michigan, from north Dakota and western Minnesota southward over northwestern Iowa and the eastern part of the middle Missouri valley, and within a limited area in southeastern Arizona. The most marked departures below the normal temperature were reported on the north Pacific coast, where, at Tatoosh Island, Wash., seven years record, the mean temperature was more than 6° below the average for the month, and the departures below the normal equalled or exceeded 2° along the north Pacific coast, in the western Saskatchewan

valley, and from south-central Indian Territory southward to southeastern Texas.

The following are some of the most marked departures from the normal at the older established stations:

Above normal.		Below normal.	
Bismarck, N. Dak.	5.8	Tatoosh Island, Wash.	6.2
Kitty Hawk, N. C.	5.8	Fort Sill, Ind. T.	2.2
Fort Thomas, Ariz.	3.6	Calgary, N. W. T.	2.0
Marquette, Mich.	3.2	Portland, Me.	1.9
New York City.	3.0	Key West, Fla.	1.8
Helena, Mont.	2.6	San Francisco, Cal.	1.2

At Kitty Hawk, N. C., sixteen years record, the mean temperature for the current month, 60°.8, was 1°.7 higher than the highest mean temperature previously reported for April, noted in 1878; at Des Moines, Iowa, twelve years record, the mean, 52°.8, was 0°.1 above the April mean of 1886; and at Omaha, Nebr., twenty years record, the mean, 55°.2, was 0°.6 above the highest previous April mean, noted in 1878.

DEVIATIONS FROM NORMAL TEMPERATURES.

The following table shows for certain stations, as reported by voluntary observers, (1) the normal temperature for April for a series of years; (2) the length of record during which the observations have been taken, and from which the normal has been computed; (3) the mean temperature for April, 1890; (4) the departure of the current month from the normal; (5) and the extreme monthly means for April, during the period of observation and the years of occurrence:

State and station.	County.	(1) Normal for the month of April.	(2) Length of record.	(3) Mean for April, 1890.	(4) Departure from normal.	(5) Extreme monthly mean temperature for April.			
						Highest.	Year.	Lowest.	Year.
<i>Arkansas.</i>		°	Years	°	°	°		°	
Lead Hill.	Boone.	62.0	8	62.4	+ 0.4	65.3	1888	56.7	1884
<i>California.</i>									
Sacramento.	Sacramento.	59.3	37	55.3	- 4.0	63.3	1857	54.6	1860
<i>Connecticut.</i>									
Middletown.	Middlesex.	45.5	23	46.9	+ 1.4	50.9	1865	38.3	1874
<i>Florida.</i>									
Merritt's Island.	Brevard.	68.1	7	73.4	+ 5.3	74.9	1885	60.0	1889
<i>Georgia.</i>									
Forsyth.	Monroe.	64.9	16	66.7	+ 1.8	68.8	1888	61.0	1875
<i>Illinois.</i>									
Peoria.	Peoria.	52.4	34	55.8	+ 3.4	57.9	1878	40.6	1857
Riley.	McHenry.	44.6	34	46.0	+ 1.4	52.2	1856	35.5	1874
<i>Indiana.</i>									
Vevay.	Switzerland.	55.0	23	56.6	+ 1.6	60.5	1866	47.4	1874
<i>Iowa.</i>									
Cresco.	Howard.	43.0	18	47.3	+ 4.3	47.3	1878	37.5	1874
Monticello.	Jones.	48.2	36	50.9	+ 2.7	56.0	1855	38.0	1857
Logan.	Harrison.	50.2	16	56.2	+ 6.0	56.2	1890	42.6	1874
<i>Kansas.</i>									
Lawrence.	Douglas.	54.5	22	56.6	+ 2.1	59.6	1876	47.7	1874
<i>Louisiana.</i>									
Grand Coteau.	Saint Landry.	69.7	7	70.0	+ 0.3	70.9	1885	68.6	1884
<i>Maine.</i>									
Orono.	Penobscot.	39.8	20	40.2	+ 0.4	45.1	1889	33.3	1874
<i>Maryland.</i>									
Cumberland.	Allegany.	48.7	31	51.8	+ 3.1	57.6	1881	42.2	1859
<i>Massachusetts.</i>									
Amherst.	Hampshire.	45.4	54	46.6	+ 1.2	52.2	1839, '78	38.3	1874
Newburyport.	Essex.	43.9	10	44.9	+ 1.0	47.5	1886	41.4	1888
Somerset.	Bristol.	45.2	17	47.5	+ 2.3	51.8	1878	38.7	1874
<i>Michigan.</i>									
Kalamazoo.	Kalamazoo.	46.7	13	49.4	+ 2.7	52.9	1878	42.0	1881
Thornville.	Lapeer.	45.6	13	46.0	+ 0.4	52.1	1878	42.3	1881, '88
<i>Minnesota.</i>									
Minneapolis.	Hennepin.	43.3	24	47.5	+ 4.2	49.2	1886	36.6	1874
<i>Montana.</i>									
Fort Shaw.	Lewis & Clarke.	44.7	20	45.3	+ 0.6	51.2	1870	38.6	1882
<i>New Hampshire.</i>									
Hanover.	Grafton.	41.2	55	41.5	+ 0.3	46.9	1887	33.7	1874
<i>New Jersey.</i>									
Moorestown.	Burlington.	49.3	26	49.7	+ 0.4	55.1	1865	42.3	1874
South Orange.	Essex.	47.6	19	49.0	+ 1.4	52.9	1878	42.2	1874

Deviations from normal temperatures—Continued.

State and station.	County.	(1) Normal for the month of April.	(2) Length of record.	(3) Mean for April, 1890.	(4) Departure from normal.	(5) Extreme monthly mean temperature for April.			
						Highest.	Year.	Lowest.	Year.
<i>New York.</i>		°	Years	°	°	°		°	
Cooperstown . . .	Otsego	40.7	36	42.8	+ 2.1	51.6	1878	33.6	1874
Palermo	Oswego	41.0	30	43.3	+ 2.3	50.0	1878	32.4	1874
<i>North Carolina.</i>									
Lenoir	Caldwell	55.6	17	57.8	+ 2.2	60.0	1887	42.6	1885
<i>Ohio.</i>									
N'th Lewisburgh .	Champaign . .	50.9	58	53.9	+ 3.0	63.0	1888	39.0	1857
Wauseon	Fulton	46.3	20	48.6	+ 2.3	54.8	1878	35.6	1874
<i>Oregon.</i>									
Albany	Linn	51.8	12	49.8	- 2.0	55.4	1888	48.4	1882
Eola	Polk	49.5	19	49.0	- 0.5	54.8	1875	43.2	1872
<i>Pennsylvania.</i>									
Dyberry	Wayne	42.0	24	43.4	+ 1.4	49.7	1878	35.0	1874
Grampian Hills . .	Clearfield . . .	43.2	25	46.8	+ 3.6	52.2	1878	29.0	1875
Wellsborough . . .	Tioga	43.7	11	44.7	+ 1.0	52.0	1886	40.1	1881
<i>South Carolina.</i>									
Statesburgh	Sumter	62.3	9	62.7	+ 0.4	64.6	1882	60.1	1884
<i>Tennessee.</i>									
Austin	Wilson	59.0	20	61.8	+ 2.8	65.3	1878	53.9	1874
Milan	Gibson	60.0	7	60.4	+ 0.4	63.3	1888	56.2	1884
<i>Texas.</i>									
New Ulm	Austin	68.6	17	68.1	- 0.5	71.5	1878, '80	63.6	1874
<i>Vermont.</i>									
Stratford	Orange	40.6	17	41.5	+ 0.9	48.3	1886	34.9	1874
<i>Virginia.</i>									
Birdsnest	Northampton .	54.5	22	55.6	+ 1.1	61.6	1880	49.4	1875
<i>Wisconsin.</i>									
Madison	Dane	44.4	22	47.0	+ 2.6	49.8	1870	37.4	1874
<i>Washington.</i>									
Fort Townsend . .	Jefferson	48.7	16	50.8	+ 2.1	59.4	1889	36.2	1889

MAXIMUM AND MINIMUM TEMPERATURES.

The highest temperature reported by a regular station of the Signal Service was 98°, at Yuma, Ariz., on the 28th. The maximum temperature rose above 90° over the central part of the Florida Peninsula, within an area extending from the middle Rio Grande valley east of north over eastern Kansas, and from the Gila Valley northwestward over southern and south-central California. The maximum temperature rose to or above 80° over eastern Pennsylvania and in the Atlantic coast states to the southward, in the Gulf States, in the western Mississippi valley, in the Missouri Valley, along the eastern slope of the Rocky Mountains, over the western parts of the northern and southern plateau regions, and on the Pacific coast, save along and near the coast line north of the thirty-eighth parallel. The lowest maximum temperature reported was 58° at Wood's Holl and Nantucket, Mass., and the maximum values were below 70° along the Maine, southeastern Massachusetts, and Rhode Island coasts, at Buffalo, N. Y., at Lake Superior stations, and along the immediate Pacific coast north of the thirty-eighth parallel. At stations in the south Atlantic states, the upper Mississippi and Missouri valleys, on the northeastern slope of the Rocky Mountains, the northern plateau region, and along the north Pacific coast the maximum temperature for the current month was as high or higher than previously reported for April. At Charleston, S. C., twenty years record, the maximum temperature, 88°, was the same as the maximum of 1888; at Springfield, Ill., eleven years record, 85°, 1° above maximum of 1887; Saint Louis, Mo., twenty years record, 89°, 1° above maximum of 1888; Leavenworth, Kans., nineteen years record, 90°, 1° above maximum of two or more years; Helena, Mont., eleven years record, 78°, the same as maximum of 1888; Spokane Falls, Wash., ten years record, 86°, the same as maximum of 1887; Walla Walla, Wash., five years record, 89°, 4° above maximum of 1888; Portland, Oregon, nineteen years record, 85°, the same as maximum of 1880; and Roseburgh, Oregon, thirteen years record, 86°, 2° above maximum of 1880. In April of preceding years the highest absolute temperature has generally been reported in the middle and south Atlantic states, the northern plateau region, and the middle and south Pacific coasts in 1888; in the extreme northwest in 1887; in the west Gulf states in 1880 or 1887; on the northeastern slope of the Rocky Mountains in 1887 or 1888; over the southern plateau region in 1879 or 1889; over the mid-

dle plateau region in 1888 or 1889; and along the north Pacific coast in 1880 or 1885; elsewhere the periods of occurrence were irregular. The reports of United States Army post surgeons and state weather service and voluntary observers show the following maximum temperatures in states and territories where temperature was reported 80° or above: Gove City, Kans., 105°; Fort Ringgold and Camp del Rio, Tex., 101°; Forts McDowell and Mojave, Ariz., 98°; El Dorado, Nev., 96°; Alva, Fla., 95°; Millen, Ga., Caddo Creek, Ind. T., and Wilcox, Nebr., 94°; Lead Hill, Ark., Riverside, Cal., Columbus, Miss., and Centerville, Mo., 93°; Mascoutah, Ill., and Bowling Green, Ky., 92°; Hardeeville, S. C., 91°; Fort Selden, N. Mex., 90°; Pendleton, Oregon, Aberdeen and Fort Bennett, S. Dak., Wiggins, Ala., Lewiston, Idaho, and at several stations in Louisiana, 89°; Lamar, Colo., Glenwood, Iowa, Chapel Hill and Washington, N. C., Steele and Wahpeton, N. Dak., Maryville, Tenn., Alexandria and Richmond, Va., 88°; Ligonier, Pa., 87°; Readington, N. J., and Portsmouth, Ohio, 86°; Marengo, Ind., Frederick, Md., and Vancouver Barracks, Wash., 85°; Fort Keogh and Powder River, Mont., Fort Wadsworth and Geneva, N. Y., and Beaver, Utah, 84°; at several stations in Minnesota, 83°; Oceana, W. Va., 82°; Lindlow and Somerset, Mass., 81°; Hartford, Conn., Neillsville, Wis., and Fort D. A. Russell, Wyo., 80°.

The lowest temperature reported by a regular station of the Signal Service was 3°, at Sault de Ste. Marie, Mich., on the 1st. The minimum temperature fell to or below 10° in the eastern part of upper Michigan, in the upper valley of the Red River of the North, and in southwestern South Dakota and central Wyoming, and the minimum values were below 20° north of a line traced from central New Hampshire and Vermont westward, north of the lower lakes to south-central Michigan, thence northwestward to central Wisconsin, thence southwestward to southern Nebraska, thence westward to east-central Colorado, thence southward to southern New Mexico, thence northward to west-central Colorado, thence northwestward to west-central Idaho, thence southwest to northwestern Nevada, and east of this line continued northward to central Oregon, and thence northeastward over western Montana. At stations on the eastern slope of the Rocky Mountains, in the southern and northern plateau regions, and on the north Pacific coast the minimum temperature for the current month was as low or lower than previously reported for April. At Fort Washakie, Wyo., five years record, the minimum temperature, 6°, was 5° below the minimum of 1883; Colorado Springs, Colo., six years record, 16°, 10° below minimum of 1889; Fort Stanton, N. Mex., seven years record, 14°, 4° below minimum of 1884; Lava, N. Mex., six years record, 27°, 3° below minimum of two or more years; Spokane Falls, Wash., ten years record, 22°, 4° below minimum of 1881; Walla Walla, Wash., five years record, 29°, the same as minimum of 1887; Fort Canby, Wash., seven years record, 35°, 1° below minimum of 1887; Neah Bay, Wash., six years record, 28°, 3° below minimum of two or more years; Port Angeles, Wash., seven years record, 28°, 1° below minimum of 1887; Astoria, Oregon, seven years record, 32°, 2° below minimum of 1886, and Roseburgh, Oregon, thirteen years record, 26°, 2° below minimum of 1887. In April of preceding years the lowest temperature has generally been reported in the middle and south Atlantic states, the northern plateau region, and the middle and south Pacific coasts in 1888; in the east Gulf states in 1887 or 1888; in the west Gulf states and the extreme northwest in 1887; in the Ohio Valley and Tennessee in 1883 or 1887; over the southern plateau region in 1879 or 1889; over the northern plateau region in 1888 or 1889; and on the north Pacific coast in 1880 or 1885; elsewhere the periods of occurrence were irregular. The reports of the United States Army post surgeons and state weather service and voluntary observers show the following minimum temperatures in states and territories where the temperature fell to or below 20°: Pokegama Falls, Minn., -17°; Climax, Colo., -3°; Fort Brady, Mich., -2°; Fort Logan, Mont., zero; Wesley, Iowa, 2°;

Steele, N. Dak., 3°; Summit Lake, Wis., and Soda Springs, Idaho, 4°; Fort Union, N. Mex., Sherman, N. Y., and Camp Sheridan, Wyo., 5°; West Milan, N. H., and Fort Meade, S. Dak., 6°; Fort Niobrara, Nebr., 7°; Ruby Hill, Nev., 8°; East Berkshire, Vt., 9°; Silver Lake, Oregon, and Hartley, Tex., 10°; Nephi, Utah, 11°; Monson, Mass., and several stations in Pennsylvania, 12°; Sycamore, Ill., 15°; Garrettsville, Ohio, and Mayfield Me., 17°; New Hartford, Conn., 19°; Fort Bidwell, Cal., Delphi and Sunman, Ind., Hoxie and Leoti, Kans., Christiansburg and Mossingford, Va., and Tannery, W. Va., 20°.

LIMITS OF FREEZING WEATHER.

The southern limit of freezing weather for April, 1890, is shown on chart iv by a line traced from the coast of east-central Virginia southwestward to central North Carolina, thence to southern Indiana, thence to southeastern Kansas, thence to extreme southwestern Texas, and thence to extreme southeastern Arizona. The western limit of freezing weather is shown by a line traced irregularly northward from southeastern Arizona to southwestern Oregon, and thence northward along or near the coast line to southwestern Washington. Compared with the limits of freezing weather for March, 1890, the line showing the southern limit of freezing weather for the current month is about nine degrees farther north on the Atlantic coast, and about seven degrees farther north in the Mississippi Valley. In March the limit of freezing weather extended south of the region of observation from the Mississippi River to the middle Gila valley, Arizona, while for the current month the minimum temperature was above freezing northward to southern Missouri and southeastern Kansas, and generally over Texas east of the one hundredth meridian. Over the southern plateau region the limit of freezing weather is somewhat farther north, and on the north Pacific coast is farther east than for the preceding month.

In April, 1889, the southern limit of freezing weather was shown by a line traced from near Boston, Mass., irregularly southwestward to central North Carolina, thence north of west to southwestern Iowa, and thence irregularly southwestward to southern New Mexico; the western limit was shown by a line traced from southern New Mexico northwestward to west-central Oregon, thence eastward over the valley of the Columbia River and thence northward into British Columbia.

RANGES OF TEMPERATURE.

The greatest and least daily ranges of temperature at regular stations of the Signal Service are given in the table of miscellaneous meteorological data. The greatest monthly ranges of temperature occurred within an area extending from western Minnesota and northwestern Iowa westward over parts of North and South Dakota, where they exceeded 70°, whence they decreased eastward to less than 30° on the coast of extreme southeastern Massachusetts, southeastward to less than 20° over extreme southern Florida, southward to less than 30° on the west Gulf coast, southwestward to 40° on the extreme south Pacific coast, and westward to less than 30° on the coast of northern California and southwestern Washington.

The following are some of the extreme monthly ranges:

Greatest.	Least.
Sioux City, Iowa 75.0	Key West, Fla. 17.0
Escanaba, Mich. 68.0	Port Eads, La. 24.0
Fort Washakie, Wyo. 66.0	Point Reyes Light, Cal. 26.0
Spokane Falls, Wash. 64.0	Nantucket, Mass. 28.0
Dodge City, Kans. 64.0	Fort Canby, Wash. 29.0

FROST.

The following is a summary of reports of damaging frost made by regular and voluntary observers of the Signal Service: on the 1st, 2d, 19th, and 20th ice formed in all parts of New Jersey and the peach crop was damaged, especially by the freezing weather of the 1st and 2d. On the 10th light frost damaged delicate plants at Little Rock, Ark. On the 11th and 12th frost injured the peach crop in Oregon. On the 11th

and 21st frost damaged crops, vegetables, and fruit in South Carolina. On the 12th and 13th about one-third of the buds of raisin vines in the neighborhood of Fresno, Cal., were killed by cold; on heavy, damp soil the destruction was light, but on high rolling soil it was great. On the 20th frost damaged young fruit trees at Dale Enterprise, Va., and killed tender plants at Spottsville and Nottaway C. H., Va.

The killing frost in New Jersey was about one week later, in Virginia two to three weeks later, in South Carolina three to four weeks later, and in Arkansas about three weeks later than the average date of last killing frost.

East of the Mississippi River and south of the fortieth parallel frost was reported most frequently in Maryland, where it was noted for sixteen dates; in Virginia and Indiana for fourteen dates; in Ohio for thirteen dates; in West Virginia for twelve dates; in New Jersey and North Carolina for ten dates; in South Carolina and Tennessee for eight dates; in Illinois for seven dates; in the District of Columbia, Georgia, and Kentucky for four dates; and in Alabama and Mississippi for two dates; in states other than those named lying south of the fortieth parallel no frost was reported. Between the Mississippi River and the Rocky Mountains and south of the fortieth parallel frost was reported most frequently in Texas, where it was noted for nineteen dates; in Colorado for sixteen dates; in Kansas for thirteen dates; in Missouri for six dates; in Louisiana for two dates; and in Indian Territory and Arkansas for one date. In the plateau region south of the fortieth parallel frost was reported for eighteen dates in Utah; for thirteen dates in Nevada; for ten dates in New Mexico; and for six dates in Arizona. On the Pacific coast frost was reported for thirteen dates in Washington; for twelve dates in Oregon; for six dates in northern California; and for five dates in southern California.

East of the Rocky Mountains and south of the fortieth parallel frost was reported in thirteen states on the 21st; in eleven states on the 11th and 20th; in ten states on the 19th; in nine states on the 6th; in eight states on the 1st, 2d, 10th, and 28th; in seven states on the 22d; in six states on the 12th; and in one to five states, inclusive, on the 3d, 5th, 7th, 8th, 9th, 14th, 16th, 17th, 18th, 27th, 29th, and 30th. Between the Mississippi River and the Rocky Mountains and south of the fortieth parallel frost was reported in six states on the 10th; in four states on the 1st, 17th, 18th, and 27th; in three states on the 2d, 4th, 9th, 22d, and 23d; in two states on the 3d, 16th, 20th, 25th, 26th, 28th, and 30th; and in one state on the 11th, 15th, 19th, 21st, 24th, and 29th. In the plateau region south of the fortieth parallel frost was reported in four states or territories on the 1st and 2d; in three on the 26th; in two on the 3d, 7th, 8th, 10th, 13th to 16th, 21st, 22d, 23d, and 25th; and in one on the 4th to 6th, 9th, 12th, 17th, 18th, 20th, 24th, and 30th. In Washington frost was reported on the 1st to 5th, 8th, 11th to 15th, 19th, and 21st. In Oregon on the 1st to 3d, 8th, 9th, 11th to 15th, 21st, and 23d. In northern California on the 8th, 12th to 15th, and 22d. In southern California on the 1st, 2d, 13th, 14th, and 15th.

TEMPERATURE OF WATER.

The following table shows the maximum, minimum, and mean water temperature as observed at the harbors of the several stations; the monthly range of water temperature; and the mean temperature of the air for April, 1890:

Stations.	Temperature at bottom.				Mean temperature of air at the station.
	Max.	Min.	Range.	Monthly mean.	
Boston, Mass.	50.0	39.7	10.3	44.4	46.3
Canby, Fort, Wash.	59.8	47.8	12.0	51.1	47.0
Charleston, S. C.	70.5	58.0	12.5	65.3	64.8
Eastport, Me.	40.2	36.9	3.3	38.1	39.2
Galveston, Tex.	75.5	68.5	7.0	71.9	69.8
Key West, Fla.	82.1	73.8	8.3	78.4	75.2
Portland, Oregon.	53.7	46.0	7.7	49.2	52.4

PRECIPITATION (expressed in inches and hundredths).

The distribution of precipitation over the United States and Canada for April, 1890, as determined from the reports of nearly 2,000 stations, is exhibited on chart iii. In the table of miscellaneous meteorological data the total precipitation and the departure from the normal are given for each Signal Service station. The figures opposite the names of the geographical districts in the columns for precipitation and departure from the normal show, respectively, the averages for the several districts. The normal for any district may be found by adding the departure to the current mean when the precipitation is below the normal and subtracting when above.

The heaviest monthly precipitation reported for April, 1890, was 16.85, at Columbia, Caldwell Parish, La., and the monthly precipitation exceeded ten inches in west-central and southwestern Arkansas, and thence south of west over Texas to the one hundredth meridian, in a small area in Texas north of Galveston, in west-central Mississippi, and at Dunsmuir, Siskiyou Co., Cal. The monthly precipitation equalled, or exceeded, five inches in areas in eastern Connecticut, west-central Pennsylvania, extreme western Virginia, extreme western North Carolina, north-central Georgia, northwestern Alabama, western and central Mississippi, eastern and southern Louisiana, in Texas east of the one hundredth meridian, generally over Arkansas, in central and southern Indian Territory, eastern and western Tennessee, eastern Kentucky, southwestern Illinois, south-central and north-central Indiana, northwestern Ohio, extreme western New York, southeastern Michigan, north-central Iowa, southeastern Missouri, western Kansas, southwestern Nebraska, southeastern Wyoming, in Siskiyou county, north-central California, and in northwestern Washington. In areas in southwestern Arizona, southern California, southwestern Idaho, northeastern Montana, western Nevada, extreme western Texas, and central Utah no precipitation was reported, and in areas in central and north-central Florida, southern Georgia, southern Alabama, northwestern Missouri, southwestern Iowa, northeastern Nebraska, northeastern South Dakota, eastern and southeastern South Dakota, southwestern Wisconsin, western Minnesota, north-central Kansas, northern New Mexico, northwestern Colorado, southern Wyoming, and eastern Oregon and Washington, less than one-half inch of precipitation was reported.

The precipitation was in excess of the average for the month along the eastern slope of the Rocky Mountains south of the forty-fifth parallel, in the west Gulf states and thence northeastward over southern Missouri, the northern part of the Ohio Valley, and the eastern part of the upper lake region, at several stations along the south New England and middle Atlantic coasts, in southeastern Arizona, and on the extreme north Pacific coast; elsewhere the precipitation was deficient. The greatest excesses in precipitation occurred in south-central Indian Territory and thence southward to central Texas, where they were more than six inches, and at one station in south-central Louisiana, Grand Coteau, with seven years record, an excess of 6.39 was reported. At Brownsville, Tex., and Logansport, Ind., the rainfall exceeded the April average by more than four inches, and over northeastern lower Michigan, and adjoining parts of Nebraska, Wyoming, and Colorado, the precipitation was more than two inches in excess of the average. The greatest deficiencies in precipitation occurred in central Alabama, where they exceeded four inches, and the deficiency was more than two inches over the southern part of the east Gulf states, and in the lower valley of the Red River of the North. Considered by districts the average percentages of the normal precipitation in districts where the precipitation was in excess were about as follows: Rio Grande Valley, 335 per cent.; southeastern slope of the Rocky Mountains, 301 per cent.; southern plateau region, 192 per cent.; west Gulf states, 144 per cent.; lower lake region and northeastern slope of the Rocky Mountains, 128 per cent.; middle-eastern slope of

the Rocky Mountains, 127 per cent.; and upper lake region, 109 per cent. In districts where the monthly precipitation was deficient the percentages of the normal were about as follows: south Pacific coast, 9 per cent.; northern plateau region, 26 per cent.; extreme northwest, 48 per cent.; east Gulf states, 51 per cent.; middle Pacific coast, 53 per cent.; middle plateau region, 57 per cent.; south Atlantic coast, 59 per cent.; Missouri Valley, 63 per cent.; upper Mississippi valley, 75 per cent.; north Pacific coast, 79 per cent.; Key West, Fla., 83 per cent.; middle Atlantic states, 88 per cent.; New England, 90 per cent.; and the Ohio Valley and Tennessee, 97 per cent. In the Rio Grande Valley and on the southeastern slope of the Rocky Mountains more than three times the usual amount of rain fell; over the southern plateau region nearly double the average amount; and in the west Gulf states the monthly precipitation was about one-half greater than the average for April. On the south Pacific coast the monthly precipitation was one-tenth; over the northern plateau region about one-fourth; and in the south Atlantic and east Gulf states, the extreme northwest, the middle plateau region, and the middle Pacific coast about one-half the usual amount for April.

The table of miscellaneous meteorological data for regular stations of the Signal Service and the table of deviations from the normal precipitation for certain stations, as reported by voluntary observers, show that at the following-named places the precipitation for the current month was the heaviest ever noted for April during the respective periods of observation: Grand Coteau, La.; Brownsville, Tex.; Wauseon, Ohio; Logansport, Ind.; Cheyenne, Wyo.; Colorado Springs, Colo.; Fort Sill, Ind. T.; Abilene, Tex.; Santa Fé, N. Mex.; Fort Bowie, Fort Grant, Fort Thomas, San Carlos, and Wilcox, Ariz. At Moorhead, Minn.; Huron, S. Dak.; Fort Assiniboine, Mont.; Keeler, Cal.; Walla Walla, Wash., and San Diego, Cal., the monthly precipitation was the least ever reported for April during the respective periods of observation.

In April of preceding years the heaviest precipitation was generally noted in the middle Atlantic states in 1874 or 1889; in the lower lake region and along the middle Pacific coast in 1880; on the southeastern slope of the Rocky Mountains in 1888; and on the north Pacific coast in 1883 or 1887; elsewhere the periods of heaviest rainfall in April were irregular. The least precipitation for April was generally reported in southern New England, the south Atlantic states, and along the middle Pacific coast in 1888; in the west Gulf states in 1887; in the Ohio Valley and Tennessee in 1888 or 1889, and over the northern plateau region and along the north Pacific coast in 1885; elsewhere the periods of least precipitation for April were irregular.

For the period January to April, 1890, inclusive, the greatest excesses in precipitation occurred on the southeastern slope of the Rocky Mountains where the rainfall was more than one-half greater, and in the west Gulf states, the Ohio Valley and Tennessee, and along the north Pacific coast where it was more than one-fourth greater than the average; the most marked deficiencies were noted in the south Atlantic and east Gulf states and the Florida Peninsula, where about one-half the usual amount of precipitation for the period named was reported.

DEVIATIONS FROM AVERAGE PRECIPITATION.

The following table shows for certain stations, as reported by voluntary observers, (1) the average precipitation for April for a series of years; (2) the length of record during which the observations have been taken and from which the average has been computed; (3) the total precipitation for April, 1890; (4) the departure of the current month from the average; (5) and the extreme monthly precipitation for April during the period of observation and the years of occurrence:

State and station.	County.	(1) Average for the month of April.	(2) Length of record.	(3) Total for April, 1890.	(4) Departure from average.	(5) Extreme monthly precipitation for April.			
						Greatest.		Least.	
						Am't.	Year.	Am't.	Year.
Arkansas.		Inches	Years	Inches	Inches.	Inches.		Inches.	
Lead Hill.....	Boone.....	3.96	8	5.71	+1.75	6.61	1882	1.57	1889
California.									
Sacramento.....	Sacramento ..	1.87	40	1.34	-0.53	14.20	1880	T.	1875
Connecticut.									
Middletown.....	Middlesex....	3.35	28	2.84	-0.51	7.16	1874	1.48	1882
Florida.									
Merritt's Island ..	Brevard.....	4.26	12	0.78	-3.48	9.74	1878	0.53	1885
Georgia.									
Forayth.....	Monroe.....	4.34	16	1.80	-2.54	9.59	1883	0.55	1888
Illinois.									
Peoria.....	Peoria.....	3.07	34	2.33	-0.74	6.25	1858	0.45	1870
Riley.....	McHenry....	2.92	39	2.88	-0.04	6.20	1868	0.60	1854
Indiana.									
Logansport.....	Cass.....	3.11	15	7.17	+4.06	7.17	1890	0.85	1857
Vevay.....	Switzerland ..	3.48	25	4.33	+0.85	7.15	1872	0.92	1889
Iowa.									
Cresco.....	Howard.....	2.17	18	1.64	-0.53	3.68	1888	1.11	1883
Monticello.....	Jones.....	2.57	34	2.09	-0.48	5.78	1862	0.63	1863
Logan.....	Harrison....	2.71	23	2.17	-0.54	5.44	1888	0.40	1870
Kansas.									
Lawrence.....	Douglas.....	3.23	23	2.51	-0.72	5.72	1885	1.08	1870
Louisiana.									
Grand Coteau....	St. Landry ..	4.25	7	10.64	+6.39	10.64	1890	1.77	1887
Maine.									
Orono.....	Penobscot...	2.95	20	2.02	-0.93	5.08	1887	1.28	1881
Maryland.									
Cumberland.....	Allegany.....	2.39	18	3.58	+0.19	6.50	1874	0.60	1879
Massachusetts.									
Amherst.....	Hampshire...	3.19	54	1.67	-1.52	8.33	1854	0.57	1844
Newburyport....	Essex.....	3.24	10	1.78	-1.46	4.99	1887	1.78	1890
Somerset.....	Bristol.....	3.87	17	3.83	-0.04	7.73	1874	1.52	1881
Michigan.									
Kalamazoo.....	Kalamazoo...	2.51	14	3.40	+0.89	8.00	1880	0.92	1876
Thornville.....	Lapeer.....	2.30	13	3.35	+1.05	6.13	1880	1.34	1889
Minnesota.									
Minneapolis....	Hennepin....	2.42	22	1.75	-0.67	5.12	1888	0.53	1881
Montana.									
Fort Shaw.....	Lewis & Clarke	0.67	19	0.06	-0.61	2.30	1886	0.04	1875
New Hampshire.									
Hanover.....	Grafton.....	2.39	47	1.57	-0.82	6.00	1840	0.38	1872
New Jersey.									
Moorestown.....	Burlington ..	2.94	26	2.14	-0.80	8.40	1874	0.67	1881
South Orange....	Essex.....	3.22	19	2.43	-0.79	7.54	1889	0.85	1881
New York.									
Cooperstown....	Otsego.....	2.94	36	2.86	-0.08	7.12	1854	0.92	1863
Palermo.....	Oswego.....	2.37	36	2.00	-0.37	7.00	1859	0.26	1879
North Carolina.									
Lenoir.....	Caldwell....	3.62	18	3.40	-0.22	7.80	1874	1.30	*
Ohio.									
N. Lewisburgh ..	Champaign ..	2.77	18	2.55	-0.22	6.45	1880	0.63	1879
Wauseon.....	Fulton.....	2.41	17	5.29	+2.88	5.29	1890	1.31	1872
Oregon.									
Albany.....	Linn.....	3.50	13	1.77	-1.73	6.53	1883	1.38	1885
Eola.....	Polk.....	2.74	19	1.00	-1.74	6.50	1883	0.89	1888
Pennsylvania.									
Dyberry.....	Wayne.....	2.45	21	2.53	+0.08	5.07	1874	0.80	1882
Gramplan Hills ..	Clearfield....	3.50	19	3.39	-0.11	6.11	1874	1.35	1870
Wellsborough....	Tioga.....	5.08	11	4.03	-1.05	10.77	1886	1.54	1881
South Carolina.									
Statesburgh.....	Sumter.....	2.37	9	2.73	+0.36	4.17	1883	0.83	1888
Tennessee.									
Austin.....	Wilson.....	4.87	22	4.39	-0.48	11.98	1877	1.79	1876
Milan.....	Gibson.....	4.00	7	5.34	+1.34	9.58	1883	1.01	1889
Texas.									
New Ulm.....	Austin.....	3.81	17	6.37	+2.56	8.00	1873	0.17	1887
Vermont.									
Stratford.....	Orange.....	2.79	17	2.10	-0.69	12.20	1874	0.60	†
Virginia.									
Birdnest.....	Northampton	3.59	21	4.50	+0.91	11.25	1889	1.10	1869
Wisconsin.									
Madison.....	Dane.....	4.63	21	2.22	-2.41	5.49	1861	0.96	1887
Washington.									
Fort Townsend..	Jefferson....	1.58	14	0.90	-0.68	2.98	1883	0.38	1877

* 1876 and 1885; † 1873 and 1881.

EXCESSIVE PRECIPITATION.

Monthly precipitation to equal or exceed ten inches for April, 1890, was reported at ten stations in Louisiana, at eight stations in Texas, at four stations in Arkansas, and at one station each in Mississippi and Indian Territory. Among the heavier rainfalls for the month were, 16.85, at Columbia, La.; 15.00, at Dardanelle, Ark.; and 13.60, at Gainesville, Tex. In April of preceding years precipitation to equal or exceed ten inches has been reported for twelve years in Louisiana and Mississippi; for eleven years in Alabama; for ten years in Arkansas; for from five to nine years, inclusive, in California, Georgia, Illinois, New York, North Carolina, Ohio, Tennessee, and Texas; and for from one to four years, inclusive, in Colorado, Connecticut, Florida, Indiana, Indian Territory, Iowa, Kansas, Kentucky, Maryland, Massachusetts, Michigan, Missouri, Nebraska, New Hampshire, New Jersey, Oregon, Penn-

sylvania, Rhode Island, South Carolina, Virginia, Vermont, Washington, and Wisconsin. In states and territories other than those named, precipitation to equal or exceed ten inches has not been reported for April of preceding years. Among the heavier rainfalls reported for April of preceding years were: 30.40, at Summit, Cal., in 1880; 23.80, at Jackson, Miss., in 1874; 23.60, at Paulding and Fellowship, Miss., in 1871; 23.41, at Mount Washington, N. H., in 1878; 21.76, at Emigrant Gap, Cal., in 1880; 21.20, at Newport Ark., in 1886; 20.35, at Brook Haven, Miss., in 1876. Exclusive of the instances and years cited, precipitation to equal or exceed fifteen inches in April has been reported for three years in Louisiana and Texas; for two years in Alabama, Arkansas, and Mississippi; and for one year in California, Georgia, Missouri, New York, North Carolina, South Carolina, and Tennessee.

For the current month precipitation to equal or exceed 2.50 inches in twenty-four hours was reported at twenty-one stations in Louisiana, and on seven dates, the 1st, 2d, 3d, 21st, 22d, 23d, and 26th; at thirteen stations in Texas, and on nine dates, the 1st, 2d, 17th, 18th, 21st, 22d, 23d, 24th, and 25th; at twelve stations in Arkansas, and on eight dates, the 2d, 3d, 14th, 15th, 16th, 24th, 25th, and 26th; at six stations in Mississippi, and on four dates, the 3d, 22d, 23d, and 24th; at five stations in Indiana, on the 25th and 26th; at three stations in Indian Territory, and on three dates, the 24th, 25th, and 26th; at two stations in Kansas, and on three dates, the 19th, 23d, and 24th; at two stations in Pennsylvania, on the 8th and 9th; at one station in California, on the 5th; at one station in Georgia, on the 3d; at one station in Illinois, on the 25th; and at one station in Nebraska, on the 21st. Among the heavier rainfalls reported for this period were: 7.00, at Shell Beach, La., on the 21st; 6.20 at Dardanelle, Ark., 15-16th; 5.60, at Colorado, Tex., 23d; 4.25, at Fayette, Miss., 22-23d; 4.50, at Marengo, Ind., 25th; and 4.14, at Mount Vernon a, Ind., 26th. In April of preceding years precipitation to equal or exceed 2.50 inches in twenty-four hours has been reported for thirteen years in Alabama and Tennessee; for twelve years in Arkansas, Georgia, Louisiana, Mississippi, and Texas; for eleven years in North Carolina; for from five to nine years, inclusive, in the Dakotas, Florida, Illinois, Indiana, Indian Territory, Iowa, Kansas, Kentucky, and Missouri; and for from one to four years, inclusive, in California, Colorado, Connecticut, District of Columbia, Maine, Maryland, Massachusetts, Michigan, Minnesota, Montana, Nebraska, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, South Carolina, Virginia, Vermont, Wisconsin, and Wyoming. In states and territories other than these named precipitation to equal or exceed 2.50 inches for the period given has not been reported for April of preceding years. Among the heavier rainfalls reported for this period for April of preceding years were: 12.28 at Point Pleasant, La., 5th, 1885; Fort Smith, Ark., 11.00, 23d, 1879; Mobile, Ala., 7.30, 19th, 1882. Exclusive of the years and instances cited, precipitation to equal or exceed five inches in twenty-four hours has been reported for three years in Texas; for two years in Alabama, Kansas, and Louisiana; and for one year in Arkansas, California, District of Columbia, Georgia, Illinois, Indiana, Indian Territory, Maryland, Pennsylvania, South Carolina, and Utah.

For the current month precipitation to equal or exceed one inch in one hour was reported at three stations in New Jersey, and on two dates, the 7th and 27th; at three stations in Texas, and on two dates, the 17th and 24th; at one station in Iowa, on the 7th; at one station in Louisiana, on the 17th; at one station in Missouri, on the 3d; and at one station in Arkansas, on the 14th. Among the heavier rainfalls reported for this period were: 1.70 inch in forty-eight minutes, at New Orleans, La., on the 17th; 1.39 inch in fifteen minutes, at Egg Harbor City, N. J., on the 27th; and 2.04 inches in forty-five minutes, at Conway, Ark., on the 14th. In April of preceding years precipitation to equal or exceed one inch in one hour has been reported for eight years in Texas, and for from one to five years, inclusive, in Alabama, Arkansas, the Dakotas, Florida,

Georgia, Illinois, Iowa, Kansas, Louisiana, Maryland, Michigan, Mississippi, Nebraska, North Carolina, Pennsylvania, South Carolina, and Tennessee. In states and territories other than those named precipitation to equal or exceed one inch in one hour has not been reported for April. Among the heavier rainfalls reported for this period in April of preceding years were: 1.50 in twenty minutes, at Jacksonville, Fla., 23d, 1883; 1.78 in twenty-five minutes, at Titusville, Fla., 19th, 1888; 2.00 in thirty minutes, at Cabaniss, Ga., 1st, 1874; 1.12 in twelve minutes, at Atlanta, Ga., 24th, 1889; 1.50 in ten minutes, at Adrian, Mich., 5th, 1888; 3.00 in forty-five minutes, at Pilot Point, Tex., 28th, 1879.

Table of excessive precipitation, April, 1890.

State and station.	Monthly rainfall to inches, or more.	Rainfall 2.50 inches, or more, in 24 hours.		Rainfall of 1 inch or more, in one hour.		
		Amt.	Day.	Amt.	Time.	Day.
Arkansas.						
Arkansas City	Inches.	Inches.		Inches.	h. m.	
Conway		2.71	24			
Dardanelle	15.00	3.00 3.45 6.20	14 2 15-16	2.04	0 45	14
Fulton	10.23	3.29	3			
Hot Springs	12.95	4.31	2			
Little Rock		3.10	25			
Little Rock Barracks		3.08	2			
Little Rock Barracks		2.65	3			
Newport (1)	10.41	2.70	3			
Lonoke		2.50	26			
Ozone		5.00	3			
Stuttgart		3.44	2			
		2.50	14			
California.						
Upper Mattole		2.77	6			
Georgia.						
Diamond		3.50	3			
Illinois.						
Mascoutah		3.70	25			
Indiana.						
De Gonia Springs		2.71	25-26			
Huntingburgh		3.00	25			
Marengo		4.50	25			
Mount Vernon		4.14	25			
New Providence		2.50	26			
Indian Territory.						
Fort Sill		3.56	24-25			
Headton	10.39	2.67	25			
Mount Vernon (1)		4.14	26			
Iowa.						
Eagle Grove				1.00	1 00	7
Kansas.						
Collier		3.00	19			
Richfield		3.38	23-24			
Louisiana.						
Alexandria	10.55	2.91	3			
Amité City		6.57	22-23			
Cameron		2.90	2			
Cheneyville	13.15	2.95	23			
Clinton		4.15	23			
Columbia	16.85	3.00	1			
Coushatta (1)	10.75	5.75	3			
		2.50	2			
Crowley		2.71	3			
Emilie		3.39	22			
Girard		2.52	22			
Grand Coteau	10.64	3.80	3			
		3.39	26			
Hammond	11.16	4.39	23			
		4.62	23			
Jeanerette	11.16	4.75	21			
		4.45	22			
Lake Charles		3.00	3			
Marksville	13.56	6.25	22			
Maurepas		4.00	23			
Melville	12.45	4.31	2			
Monroe		3.33	3			
New Orleans				1.70	0 46	17
Paincourtville		3.85	23			
Plaquemine		4.21	22			
		3.50	3			
Shell Beach	12.25	7.00	21			
Mississippi.						
Fayette		4.25	22-23			
Greenville	11.01	4.10	24			
Natches		3.01	23			
Summit		3.20	22			
Washington		3.57	23			
Waynesborough (1)		2.84	3			
Missouri.						
Steelville				1.05	1 00	3
Nebraska.						
North Platte		2.84	21			
New Jersey.						
Atlantic City				1.95	1 55	27
Egg Harbor City				1.39	0 15	27
Freshhold				1.09	0 40	7
Pennsylvania.						
Altoona		3.13	9			
Wellsborough		2.76	8			

Table of excessive precipitation—Continued.

State and station.	Monthly rainfall to inches, or more.	Rainfall 2.50 inches, or more, in 24 hours.		Rainfall of 1 inch, or more, in one hour.		
		Amt.	Day.	Amt.	Time.	Day.
<i>Texas.</i>						
Abilene.....	<i>Inches.</i>	<i>Inches.</i>		<i>Inches.</i>	<i>h. m.</i>	
Brownsville.....		2.82	23-24			
Brownwood.....		3.46	17-18	1.45	1 00	17
Caddo Peak.....				1.09	1 00	24
Colorado.....		2.93	25			
Columbia.....	10.21	5.60	23			23
Forestburgh.....		2.75	21			
Gainesville.....	11.12	4.69	24-25			
Graham.....	13.60	5.40	24			
Haskell.....	10.16					
		2.74	22			
Houston.....	10.59	4.75	2			
		3.76	21			
Howe.....	10.34					
Longview.....		2.90	2			
Mountain Springs.....	10.22					
New Braunfels.....		3.93	23			
Palestine.....				1.06	0 55	24
Pike.....	12.15	3.40	1-2			
		2.80	23			
Tyler.....		4.00?	25			

Received too late for publication in March Review.

California.						
Placerville, (2)	12.94					
Sandwich Islands.						
Honolulu	10.59	3.53	8			
Colony Surinam, S. A.						
Burnside-Coronie		3.90	10			

Received too late for general discussion of weather, April, 1890.

Arkansas.						
Conway	12.18					
Dallas	11.55					
Lonoke	11.88					
Ozone	12.83					
Washington	10.34					
California.						
Dunsmuir	11.85					

MAXIMUM RAINFALLS IN ONE HOUR OR LESS.

The following table is a record of the heaviest rainfalls during April, 1890, for periods of five and ten minutes and one hour, as reported by regular stations of the Signal Service furnished with self-registering gauges:

Station.	Maximum fall in—					
	5 min.	Date.	10 min.	Date.	1 hour.	Date.
	Inch.		Inch.		Inch.	
Bismarck, N. Dak.			0.05	22	0.25	22
Boston, Mass.			0.10	27	0.28	27
Buffalo, N. Y.	0.25	9	0.35	9	0.45	9
Cincinnati, Ohio			0.10	26	0.16	26
Chicago, Ill.					0.15	8
Cleveland, Ohio					0.20	30
Detroit, Mich.					0.75	21
Denver, Colo.					0.35	21
Galveston, Tex.	0.15	31	0.25	21	0.75	21
Jupiter, Fla.	0.20	21	0.25	21	0.35	21
Marquette, Mich.					0.12	10
New York City			0.09	4	0.19	4
New Orleans, La.	0.25	17	0.53	17	1.75	17
Norfolk, Va.	0.05	7	0.09	7	0.24	7
Philadelphia, Pa.						
Savannah, Ga.	0.15	28	0.25	28	0.50	28
Saint Paul, Minn.			0.05	8	0.25	8
San Francisco, Cal.			0.06	18	0.28	18
Santa Fe, N. Mex.					0.15	15
Saint Louis, Mo.						
Washington City	0.15	4	0.15	4	0.25	9

* Record incomplete.

† No record.

SNOW (snowfall in inches and tenths.)

The greatest depth of snowfall was reported at the more elevated stations in west-central Colorado, where it exceeded forty inches; in extreme southwestern Nebraska fifteen inches were reported; along the line of the Central Pacific Railroad in eastern California and in extreme east-central Nevada more than twenty-five inches of snow fell; and in extreme southeastern Wyoming more than twenty inches were reported. In extreme east-central Arizona, extreme west-central Kansas,

northeastern lower Michigan, extreme eastern upper Michigan, and southwestern South Dakota more than ten inches fell; and in central Maine, southeastern Massachusetts, central New Hampshire and Vermont, and extreme northwestern Oregon, more than five inches fell. In the Atlantic coast states appreciable snowfall was reported as far south as southern Virginia; in the Ohio Valley to southern Ohio; in the upper lake region to the southern shore of Lake Michigan; in the upper Mississippi valley to southeastern Minnesota; on the eastern slope of the Rocky Mountains to the northern part of the Panhandle of Texas; in the plateau region to extreme southeastern Arizona; and on the Pacific coast southwestward in western Oregon to about the forty-fourth parallel.

Snowfall of five inches, or more, was reported as follows, and in states and territories where the maximum depth was less than that amount, the station reporting the greatest is given:

Arizona.—Cooley Springs, 14; Show Low, 10. *California*.—Summit, 26; Cisco, 15; Emigrant Gap, 14. *Colorado*.—Alma, 43.5; Fraser, 35; Boulder Cañon, 32; Agate and Durango, 30; Ranch, near Como, 26.3; Box Elder, 25; Monte Vista, 24; Breckenridge, 21.5; West Cliff, 19; Abbott, 16; San Luis Experimental Station, 15.5; Yuma and Peyton, 15; Eagle Farm, 14; Colorado Springs, 13.8; Kirk, 13.5; Georgetown, 12.5; Brush, Deer Trail, and Fort Morgan, 12; Cañon City, 11.5; Hardin, 11.2; Aroya and Wray, 10; Sanborn, 9.1; Carlisle and Thon, 9; Beaver Creek, 8.9; Bennet, Denver, and Watervale, 7; Apishapa, Delta, and Husted, 6; Fort Crawford, and Sunnyside, 5.3; Cheyenne Wells, Kit Carson, and Leadville, 5. *Connecticut*.—Southington, Wallingford, and Waterbury, 3. *Idaho*.—Era, 1. *Indiana*.—Point Isabel, 0.8. *Kansas*.—Weskan, 12; Grainfield and Tribune, 7.5; Leoti and Winona, 7; Lakin and Oakley, 6; Monument and Shields, 5. *Kentucky*.—Newport Barracks, trace. *Maine*.—Mayfield, 7; Farmington, 6.5; Cornish and Orono, 6; West Jonesport, 5. *Massachusetts*.—Cotuit, 6. *Michigan*.—Fort Brady, 12.9; Roscommon, 10; Grayling, 9; Crystal Falls, 8.5; Alpena, 6.9; Caldwell and Ivan, 6. *Minnesota*.—Duluth, 1.5. *Montana*.—Blackfoot Agency, 3.5. *Nebraska*.—Kimball, 15; Hay Springs, 7.5. *Nevada*.—Ruby Hill, 26. *New Hampshire*.—Plymouth, 6; Berlin Mills and West Milan, 5. *New Jersey*.—Egg Harbor City, 1. *New Mexico*.—Santa Fé, 4.5. *New York*.—Fort Wadsworth, 3. *North Dakota*.—Fort Buford, 3.5. *Ohio*.—Carrollton and Columbus, 2. *Oregon*.—Vernonia, 7.5. *Pennsylvania*.—Mauch Chunk, 3. *Rhode Island*.—Kingston and Lonsdale, 3. *South Dakota*.—Spearfish, 10.5; Oelrich, 8; Fort Meade, 7.1. *Texas*.—Ochiltree, 3. *Vermont*.—Chelsea,

6. *Virginia*.—Woodstock, 2. *Washington*.—Fort Townsend, 1. *West Virginia*.—Mount Alto and Seven Pines, 3. *Wisconsin*.—Summit Lake 0.5. *Wyoming*.—Cheyenne, 22; Fort D. A. Russell 12.

DEPTH OF SNOW ON GROUND AT CLOSE OF MONTH.

Chart iv shows the depth of snow reported on the ground at the close of the month. In the north-central part of upper Michigan one-half inch of snow was reported; in central-lower Michigan two-tenths inch, and in central Vermont, trace. No reports of snow on the ground at the close of the month have been received from other sections of the country. At the close of March, 1890, snow was generally reported on the ground north of the thirty-seventh parallel and east of Arizona, in the middle plateau region, on the northeastern slope of the Rocky Mountains, and over the eastern part of the upper plateau region.

HAIL.

Description of the more severe hail storms of the month are given under the heading "Local storms." Hail was reported as follows: 1st, Ariz., Colo., Tex. 2d, La., Tex. 3d, Ill. 4th, Md., N. Y., Ohio, Wash. 6th, Ill., Iowa, Mo., Oregon, Va., Wash. 7th, Ill., Ind., Iowa, Minn., Pa., Wash., Wis. 8th, Conn., Ill., Ind., Iowa, Ky., Mass., Mich., N. Mex., N. Y., Ohio, Pa., Wis. 9th, Ala., Conn., Ill., Ind., Iowa, Ky., Md., Mich., N. J., N. Y., N. C., Ohio, Pa., Va. 10th, Iowa, N. Y., N. C., Ohio, Pa., Va., Wash., W. Va. 11th, Oregon, Wash. 12th, Ohio, Oregon, Wash., Wis. 13th, Ill., Iowa, Mo. 14th, Iowa, Miss. 15th, Ohio, S. C. 16th, Ariz. 17th, Wash., W. Va. 18th, Cal., N. Mex. 19th, Ariz., Colo., Iowa, N. C., Tex., Wyo. 20th, Colo., Iowa, N. Mex., N. C., Tex., Utah. 21st, Colo., Nebr., N. C. 22d, Kans., Minn., N. C., Tenn. 23d, Ariz., Kans., Ohio. 24th, Ariz., Ind. T., Tex. 25th, Iowa, La., Mass., N. Mex., Tex. 26th, Conn., La., N. Y., Ohio, Tenn., Tex. 27th, Colo., Ga., Iowa, Md., N. J., N. Y., N. C., Tenn., Va. 28th, Colo., Fla., N. C. 29th, Colo., Ohio. 30th, Ark., Idaho, Iowa, Mich., Tex.

SLEET.

Sleet was reported as follows: 1st, Ariz., Colo., Kans., N. Mex., Vt. 2d, Colo., Kans. 4th, N. Y. 5th and 7th, Vt. 8th, Conn., N. Y., Ohio, Pa. 9th, Ill., Ind., Ky., Mich., Pa. 10th, Ohio, W. Va. 11th, Oregon. 12th, Kans., Wash. 13th, Iowa. 14th, Ohio. 15th, N. Mex., Ohio. 16th, Va. 17th, Vt. 18th, N. Mex. 19th, Colo. 21st, Wyo. 22d, Minn. 24th, Nebr. 25th, Mass., N. H. 26th, Conn., Mass., N. Y., Pa., Vt. 27th, Vt.

WINDS.

The prevailing winds during April, 1890, are shown on chart ii by arrows flying with the wind. In New England, the middle and northern plateau regions, and the middle and northern Pacific coasts the winds were mostly from northwest to southwest; in the middle Atlantic states from south to northwest; in the south Atlantic states and on the southeastern slope of the Rocky Mountains from south to southwest; in Florida from east to southeast; in the east Gulf states, Tennessee, and the upper Mississippi valley from southeast to southwest; in the west Gulf states from southeast to south; in the Rio Grande Valley from the southeast; at Lake Ontario stations from west to southwest; at Lake Erie stations from north to east; in the Missouri Valley and on the middle-eastern slope of the Rocky Mountains from south to east; over the southern plateau region from south to west; along the south Pacific coast from west to northwest; and in the Ohio Valley, the upper lake region, the extreme northwest, and the northeastern slope of the Rocky Mountains, variable.

HIGH WINDS (in miles per hour).

Maximum velocities of fifty miles, or more, per hour were reported at regular stations of the Signal Service as follows:

3d, 50, s., at Saint Louis, Mo. 6th, 51, se., at Fort Canby, Wash. 7th, 60, sw., at Winnemucca, Nev.; 70, se., at Fort Canby, Wash. 8th, 60, nw., at North Platte, Nebr.; 56, nw., at Cheyenne, Wyo.; 50, nw., at Bismarck, N. Dak.; 54, n., at Valentine, Nebr.; 60, n., at Rapid City, S. Dak.; 54, n., at Dodge City, Kans.; and 54, n., at Fort Elliott, Tex. 9th, 52, w., at Columbus, Ohio; and 53, sw., at Buffalo, N. Y. 10th, 63, w., at Fort Assiniboine, Mont. 11th, 54, ne., at Fort Sully, S. Dak.; 52, sw., at Chicago, Ill. 12th, 56, sw., at Chicago, Ill. 17th, 56, se., at Fort Canby, Wash.

LOCAL STORMS.

On the 2d heavy rain injured crops and caused washouts on railroads at Palestine, Tex. On the 8th severe storms occurred in Illinois, Ohio, Iowa, and Michigan; wind storms prevailed in Wyoming, Nebraska, North Dakota, South Dakota, Kansas, and northern Texas, and a heavy storm was reported on the lower lakes. The report of the Ohio Meteorological Bureau states that severe tornadoes visited Huron, Medina, and Summit counties, Ohio, at 6 p. m., 8th. The Huron county storm pursued a course a little north of east, passing through Norwalk, East Townsend, and Wakeman, after which it moved to the

southeast and apparently lost its force before reaching the eastern line of the county. This storm was undoubtedly a true tornado. A funnel-shaped cloud was reported, which seemed to lift and dip, reaching the earth from time to time, and considerable damage was done to buildings and trees. From the report made by Prof. H. V. Egbert, of Buchtel College, Akron, Ohio, it is evident that the Summit county storm was a continuation of the one reported in Medina county. The tornado seems to have formed near the border line of Montville and Sharon townships, and to have pursued a southeast course across Sharon township for a distance of about five miles, ending about twelve miles west of Akron. It was next felt at a point about four miles southeast of Akron at 7.30 p. m., and from this point it pursued a course of about five miles in a southeasterly direction. The weather was very sultry before the storm and moderately cool afterward. A storm swept over Highland Park, Ill., destroying property to an estimated value of \$40,000, and severe storms, attended by heavy hail, were reported at Roberts and Prophetstown, Ill. On the night of the 9th a severe storm swept along the Rappahannock Valley, Virginia, demolishing trees, etc., and very heavy rain fell. Western Pennsylvania was visited by unusually heavy rain, wind, and electrical storms; severe wind and thunder-storms prevailed in the Lake region; and heavy storms were reported in South Carolina, Georgia, and eastern

Alabama. On the 13th a severe rain and hail storm passed over the northern part of Champaign county, Illinois; the hail-stones were of unusual size, and a large number of cattle were killed. On the night of the 23d-24th an unusually severe thunder-storm passed over Abilene, Tex. Numerous bridges were carried away by swollen streams, much stock was drowned, crops sustained serious damage, and many settlers in Lythe Creek bottom were rescued with difficulty. A heavy thunder-storm, accompanied by hail, occurred the night of the 24th; the hail-stones were compact pieces of ice, oval in form, solid in structure, and about the size of a chestnut. From the 24th to 26th great damage by heavy rains was reported in Texas; large tracts of country in the north-central and central sections of the state were under water, and the inundation extended into Indian Territory. Railroads suffered from washouts and the loss of bridges. On the evening of the 25th a heavy rain and hail-storm passed over the southeastern part of Memphis Tenn., covering the ground with hail-stones as large as hickory nuts. On the 27th, between 3.45 and 4.00 p. m., a heavy hail storm passed southeastward over Baltimore, Md. The hail-stones were very large, many measuring more than two inches in diameter and weighing over four ounces. Thousands of window panes, mostly with western exposure, were broken by the hail. Very heavy rain fell with the hail, 0.80 inch having fallen in fifteen minutes.

INLAND NAVIGATION.

STAGE OF WATER IN RIVERS AND HARBORS.

The following table shows the danger-points at the several stations; the highest and lowest water during April, 1890, with the dates of occurrence and the monthly ranges:

Heights of rivers above low-water mark, April, 1890 (in feet and tenths).

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
Red River:						
Shreveport, La.	29.9	30	30.6	1	26.2	4.4
Arkansas River:						
Fort Smith, Ark. ...	22.0	28	27.0	1	4.4	16.6
Little Rock, Ark. ...	23.0	29, 30	24.3	13	10.5	13.5
Missouri River:						
Ft. Buford, N. Dak.		6	4.4	16, 21, 22, 23	0.9	3.5
Sioux City, Iowa.		14	9.5	19	6.5	3.0
Omaha, Nebr.	18.0	15	10.0	1, 2	6.4	3.6
Kansas City, Mo.	21.0	14	9.6	1, 30	6.7	2.9
Mississippi River:						
Saint Paul, Minn.	14.5	13	5.5	2, 3	1.5	4.0
La Crosse, Wis.	24.0	15, 19, 20	9.1	2, 3	3.1	6.0
Dubuque, Iowa.	16.0	23, 24	12.1	1, 3	3.6	2.5
Davenport, Iowa.	15.0	26, 27	8.7	2, 3	2.8	5.9
Keokuk, Iowa.	14.0	27 to 30	8.4	5	3.2	5.2
Saint Louis, Mo.	32.0	27	18.7	13, 14	12.0	6.7
Cairo, Ill.	40.0	3, 4, 5, 6	48.7	22	33.3	15.4
Memphis, Tenn.	33.0	3, 4, 5, 6	35.6	28	28.0	7.6
Vicksburg, Miss.	41.0	25	49.1	1	46.3	2.8
New Orleans, La.	13.0	3	16.3	30	14.7	1.6
Ohio River:						
Pittsburgh, Pa.	22.0	10	18.8	24, 25	3.6	15.2
Parkeersburg, W. Va.	38.0	12	26.6	27	6.8	19.8
Cincinnati, Ohio.	50.0	1	42.0	26	18.9	23.3
Louisville, Ky.	25.0	1	27.6	26	9.0	18.6
Cumberland River:						
Nashville, Tenn.	40.0	1	26.8	16	10.6	16.2
Tennessee River:						
Chattanooga, Tenn.	33.0	20	20.4	16	6.9	13.5
Monongahela River:						
Pittsburgh, Pa.	29.0	10	18.8	24, 25	3.6	15.2
Savannah River:						
Augusta, Ga.	32.0	6	12.2	30	7.4	4.8
Willamette River:						
Portland, Oregon.	15.0	30	10.1	1	5.0	5.1

*On April 1st the zero of the gauge at Memphis, Tenn., was lowered one foot, and all stages of water reported for previous dates should have one foot deducted, for purposes of comparison.

FLOODS.

The extreme flood conditions which prevailed in the lower Mississippi valley during March continued through April. At the beginning of the month twenty-one crevasses or breaks had occurred in the levees of the Mississippi River in Arkansas, Mississippi, and Louisiana. The breaks at Offutt and

Skipwith, Miss., had flooded southern Washington, Issaquena, and western Sharkey counties, Miss.; all of the streets in the upper part of Greenville, Miss., were under water; Huntington, Miss., was inundated, and the land back of Rolling Fork, Miss., and all of the country back of Mayersville, Miss., was flooded. The water flowing from the Nita crevasse had covered the greater portion of Saint James, Saint John, Saint Charles, and Jefferson parishes, Louisiana, as early as the 4th of the month, and on the 13th it reached the Illinois Central Railroad, and within twenty-four hours had covered the tracks for twenty miles. A great amount of water from the Nita crevasse passed into Lake Pontchartrain by means of the Manchac Passes, raising the level of the lake materially, and a high southeast wind on the 22d had the effect of flooding the rear part of New Orleans by driving the water from the lake.

The following is a list of crevasses reported during the month, with the stage and the rise or fall of the river at the more important points:

On the 1st there had been a sharp fall in all the tributaries of the Mississippi, except the Arkansas River, and the Mississippi River was falling from Memphis, Tenn., to Vicksburg, Miss. The stage of the water at Cairo, Ill., was 48.5 feet and rising; at Memphis, Tenn., 35.3 feet and rising; at Arkansas City, Ark., 48.5 feet and stationary; at Helena, Ark., 47.5 feet; at Natchez, Miss., 45.6 feet; at Vicksburg, Miss., 46.3 feet and stationary; at Red River Landing, La., 45.1 feet; at New Orleans, La., 15.9 feet and stationary; and at Baton Rouge, La., 34.9 feet. On the 2d a small break occurred at Bohemia, La., fifty miles below New Orleans; the stage of the river at Cairo, Ill., was 48.6 feet, and the Ohio River at that point had risen 2 feet in eight days. The Tennessee, Cumberland, and upper Mississippi rivers were falling rapidly; the lower Mississippi river was rising at Memphis, Tenn., Vicksburg, Miss., and New Orleans, La., and falling at Helena and Arkansas City, Ark. By the 3d the river had risen slowly at Memphis, Tenn., and had again reached the high-water mark, 35.6 feet; a second break had occurred in the levee at Bohemia. On this date the lower Mississippi river was rising, except at Helena, Ark., and New Orleans, La., where it was stationary. On the 4th the Levee at Catfish Point, Miss., fifty-five miles above Greenville, Miss., broke, the crevasse rapidly widening to 1,500 feet. Three lives were reported lost by the breaking

of this levee, many houses were washed away, several thousand acres of cultivated land were submerged, much stock was drowned, and the town of Bolivar, Miss., was under water. On this date the river was rising at Memphis, Tenn., Vicksburg, Miss., and New Orleans, La.; it was falling at Helena and Arkansas City, Ark.; and was stationary at Cairo, Ill. On the 5th the levee was cut at Boggy Bayou, fifteen miles above Arkansas City, Ark.; by the end of the month this break had widened to 273 feet. Nine breaks occurred between Catfish Point and Easton Landing, Miss., on the 4th and 5th, on account of the volume of water passing in through the break at Catfish Point and passing out over the levee into the river again at the next bend of the river. On this date the stage of the water at Cairo, Ill., was 48.7 feet and stationary; at Memphis, Tenn., 35.6 feet and rising; at Arkansas City, Ark., 47.9 feet and falling; at Helena, Ark., 47.3 feet and falling; at Vicksburg, Miss., 46.8 feet and rising; at Natchez, Miss., 45.8 feet; at Red River Landing, La., 45.6 feet; at New Orleans, La., 16.1 feet and falling; and at Baton Rouge, La., 35.2 feet. On the 6th the river at Memphis, Tenn., which had remained at 35.6 feet since the 3d, began to fall slowly; the river was rising at Vicksburg, Miss., and was stationary at Cairo, Ill., and New Orleans, La. On the 7th the Opossum Fork levee, seventy-seven miles above Vicksburg, was cut and great damage was done to adjacent property. On this date the river was rising at Vicksburg, Miss., nearly stationary at Memphis, Tenn., and falling at Cairo, Ill., Helena, Ark., and New Orleans, La.

On the 8th a crevasse 215 feet wide occurred at Simmesport, Avoyelles parish, La., on the Atchafalaya River. On the 10th two breaks occurred at Bedford, La., but a new levee was immediately thrown up behind the old one; a small break occurred sixty miles below New Orleans, but was promptly closed; the crevasse at Live Oak Plantation, La., was closed; and at Bohemia, La., a new break 35 feet wide occurred, and the entire levee at that place was reported in a bad condition. On this date the river was rising steadily below Vicksburg and had been rising for about a week at the rate of about two inches a day as a result of the flood from the Ohio River. On the 11th another small break was reported at Bohemia, La. On the 14th 100 feet of levee gave way at Plaquemine, La. On this date the river was falling at Cairo, Ill., and Memphis, Tenn.; was stationary at Helena, Ark., and Vicksburg, Miss., and was rising at New Orleans. On the 17th the river at Memphis, Tenn., which had been falling slowly since the 6th, began to fall more rapidly. On the 18th two small breaks occurred on the west bank of the Atchafalaya, but they were promptly closed. A break was also reported at Saint Gabriel, La. On this date the river was falling at Cairo, Ill., Memphis, Tenn., and Helena, Ark.; was rising at Vicksburg, Miss., and stationary at New Orleans, La. On the 19th a crevasse 60 feet wide occurred at Riceland Plantation, La., and three small breaks, the largest being 70 feet wide, occurred at Wilkinson's Plantation, on the east side of the river, thirty-five miles below New Orleans. On this date the river continued to fall at Cairo, Ill., Memphis, Tenn., and Helena, Ark.; was rising at Vicksburg, Miss., and stationary at New Orleans, La. On the 21st the levee broke at midnight at Bayou Sara, thirty miles above Baton Rouge, La.; a crevasse 50 feet wide occurred at Martinez Place, ten miles below Baton Rouge, La.; there were several breaks, the largest being 200 feet wide, in Plaquemine parish, near Saint Sophie; the upper end of the old Morganza levee gave way; in the Pointe Coupee levees a crevasse 840 feet wide occurred at Fanny Riche, and one 50 feet wide at Preston. On this date the river was stationary at Vicksburg, Miss., and falling above that point; it was 16.0 feet on the gauge at New Orleans, La., but fell 1.0 foot at that place by the 25th. On the 22d the highest water of the month, 31.9 feet, occurred at Plaquemine, La.; a crevasse occurred at Lake Concordia, Concordia parish, La.; a break 650 feet wide occurred in the levee at Morganza, Point Coupee parish, La.; a break 100 feet wide occurred at Martinez, ten miles below Baton Rouge, La.; sev-

eral breaks were reported at Saint Sophie, Plaquemine parish, La.; a break 150 feet wide occurred at Vidalia, La.; and breaks were reported at Lobdell's Landing, sixteen miles above Baton Rouge, La., and at Racconci, Point Coupee parish, La. On this date the river was rising at Vicksburg, Miss., where it measured 48.8 feet on the gauge, and was falling above that point and at New Orleans, La.

On the 23d the crevasse at Saint Sophie was closed; the Red River fell below the danger-line at Shreveport, La.; the highest water of the month, 48.55 feet, occurred at Natchez, Miss.; on the Atchafalaya River a break 150 feet wide occurred at Ferguson, and one 110 feet wide at Barbin's; on the Pointe Coupee front a crevasse 110 feet wide occurred at Lanaux, and one 90 feet wide at Sneed. On this date the river was 33.4 feet and rising at Cairo, Ill.; 48.9 feet and rising at Vicksburg, Miss.; and was falling at Memphis, Tenn.; Helena, Ark., and New Orleans, La. On the 24th a break 700 feet wide occurred at Fanny Joor Place, Pointe Coupee front, and the highest water of the month, 45.1 feet, was reported at Saint Joseph, La. The river continued to rise at Cairo, Ill., and Vicksburg, Miss., and was falling at Memphis, Tenn., Helena, Ark., and New Orleans, La. On the 25th a break 1,200 feet wide occurred in the lower Morganza levee. On this date the river was 33.5 feet and stationary at Cairo, Ill.; 28.7 feet and stationary at Memphis, Tenn.; 47.1 feet at Arkansas City, Ark.; 49.1 feet and rising at Vicksburg, Miss., and 15.0 feet and falling at New Orleans, La. On the 26th the river was falling at Vicksburg, Miss., and along the upper Louisiana front. On the 28th the Martinez crevasse was closed; the Red River again reached the danger-line at Shreveport, La., and continued to rise at that place until the close of the month, when it stood at 30.6 feet, the highest water reached this year; a slight rise set in at Memphis, Tenn., and the river continued to rise at that point until the close of the month; the river was rising at Cairo, Ill., and falling at Vicksburg, Miss., and New Orleans, La. On the 30th a break 300 feet wide occurred at Point Manoir, West Baton Rouge parish, La. At the close of the month the river was 36.2 feet and rising at Cairo, Ill., and 3.8 feet below the danger-line; at Memphis, Tenn., 28.6 feet and rising, and 4.4 feet below the danger-line; at Helena, Ark., 41.3 feet and falling, and 4.3 feet below the danger-line; at Vicksburg, Miss., 48.7 feet and falling, and 7.7 feet above the danger-line; at New Orleans, La., 14.7 feet and falling, and 1.7 foot above the danger-line; at Shreveport, La., the Red River was 30.6 feet and rising, and 0.7 foot above the danger-line; at Fort Smith, Ark., the Arkansas River was 18.5 feet and falling, and 2.5 feet above the danger-line; and at Little Rock, Ark., the Arkansas River was 24.3 feet and falling, and 1.3 foot above the danger-line. From April 1st to 30th there was a fall of 12.3 feet in the river at Cairo, Ill.; a fall of 6.7 feet at Memphis, Tenn.; a fall of 6.2 feet at Helena, Ark.; a fall of 2.7 feet at Arkansas City, Ark.; a rise of 2.4 feet at Vicksburg, Miss.; a rise of 2.2 feet at Natchez, Miss.; a rise of 2.5 feet at Red River Landing, La.; a fall of 1.2 foot at New Orleans, La.; and a fall of 0.1 foot at Baton Rouge, La.

The present flood proceeded mainly from the Ohio River and its tributaries, aided by a very high stage of water in the White and Arkansas rivers. There were six rises in the upper Ohio river met by freshets from the Cumberland and Tennessee rivers, resulting in four distinct rises at Cairo, Ill. The amount of territory overflowed and the damage to property and stock cannot be estimated at the present time. The country generally between the Mississippi and Ouachita rivers was under water, all lowlands being submerged. The water from the crevasses in southern Louisiana caused an incalculable amount of damage, and it was not thought that the water would recede in time to permit of the cultivation of a greater part of the inundated land. The flood in Louisiana was only exceeded in recent years by the floods of 1874 and 1882. Not less than fifteen parishes, or one-fourth of the state, was affected. In 1882 the loss was placed at \$15,000,000. It will probably be about one-half of that amount this year. In 1882 the breaks

occurred with a rising river, while in the flood of the present year the Mississippi had begun to fall from Cairo to Vicksburg before the most disastrous crevasses occurred. The Pointe Coupee levees protected the sugar belt and were the most important in the state of Louisiana, or in the entire Mississippi system. The principal of these was the great Morganza levee, which was the first to go along the Pointe Coupee front; it was closely followed by numerous other breaks, and practically the entire parish was flooded, save sections protected by interior levees. The vast volume of water which escaped through the Pointe Coupee breaks caused a marked fall in the river below. The flooded area in Louisiana was probably not less than 5,000 square miles. The Austin crevasse overflowed about 10,000 acres of cleared land in Mississippi, and on the Arkansas side of the river about 10,000 acres were inundated.

The Ohio River fell below the danger line at Louisville, Ky., during the 1st, and by the 23d it was again confined to its banks at Paducah, Ky. On the 9th a large part of Johnstown, Pa., was flooded. The excessive rainfall of the latter part of the month caused disastrous floods in north-central Texas, more especially along the Trinity River.

OPENING OF NAVIGATION.

Lake Superior.—Boats arrived and departed from Duluth, Minn., and Marquette, Mich., during the latter part of the month, and Mackinaw Straits, which were closed by ice on the 1st, were open to navigation on the 11th.

Green Bay.—On the 11th the bay was free of ice as far as could be seen from Green Bay, Wis., and on the night of this date the lights at Grassy Island and Long Tail Point were lighted for the first time this season.

Sault de Ste. Marie River.—A steam barge arrived at Sault de Ste. Marie, Mich., 20th; this was the first arrival of the season.

Mississippi River.—The first through boat of the season from the south arrived at Saint Paul, Minn., 24th. The first boat of the season passed up the river at Dubuque, Iowa, on the 1st.

Missouri River.—At Fort Buford, N. Dak., the ice began to break up on the 5th, and by the 8th the river was clear of ice. At Fort Yates, N. Dak., the ice broke up on the morning of the 4th, and the river was clear of ice on the 10th. At Fort Sully, S. Dak., the river was clear of ice on the 6th, but the water was so low as to seriously interfere with navigation.

ATMOSPHERIC ELECTRICITY.

AUORAS.

Auroras were observed during the month as follows: 7th, South Canisteo, N. Y. 8th, Fort Custer, Mont., and Greenville, Pa. 11th, South Canisteo, N. Y. 14th, Clinton, Iowa; Glasgow, Wis., and Rolling Green, Minn. 15th, Saint Vincent, Minn. 16th, Boston, Mass., and Eastport, Me. 17th, Fort Custer, Mont., and Glasgow, Wis. 22d, Lyons, N. Y. 24th, Berrien Springs, Mich. 26th, Middleburgh, N. Y. 27th, Oskaloosa, Iowa.

Fort Custer, Mont., 8th: a faint auroral light was observed at 10.45 p. m., and lasted until 11.10 p. m. It was in the form of a diffused light located 20° west of north. Another aurora was observed between 10.15 p. m. and 11.15 p. m., 17th. It consisted of an irregular pale arch of light in the northern sky, and rose to about altitude 45°.

Saint Vincent, Minn.: an auroral display, consisting of a pale diffused light, was observed from 9.40 p. m. to 11.45 p. m., 15th; it extended from azimuth 195° to 240° and to altitude 10°.

THUNDER-STORMS.

The more severe thunder-storms of the month are described under "Local storms." East of the Rocky Mountains thunder-storms were reported in the greatest number of states and territories, twenty-four, on the 9th; in eighteen on the 27th; in seventeen on the 8th, 14th, 26th, and 30th; in from eleven

to sixteen, inclusive, on the 2d, 3d, 4th, 7th, 13th, 22d to 25th, 28th, and 29th; in from five to ten, inclusive, on the 1st, 6th, 10th, 12th, and 15th to 21st; and in two on the 5th and 11th. There were no dates on which thunder-storms did not occur east of the Rocky Mountains.

East of the Rocky Mountains thunder-storms were reported on the greatest number of dates, twenty-four, in Texas; on nineteen in Michigan; on sixteen in Kansas; on from eleven to fifteen, inclusive, in Arkansas, Florida, Illinois, Iowa, Louisiana, Minnesota, Mississippi, Missouri, New York, North Carolina, Ohio, and Tennessee; and on from one to ten, inclusive, in Alabama, Connecticut, North Dakota, District of Columbia, Georgia, Indiana, Indian Territory, Kentucky, Maryland, Massachusetts, Montana, Nebraska, New Hampshire, New Jersey, Oregon, Pennsylvania, Rhode Island, South Carolina, South Dakota, Vermont, Virginia, West Virginia, and Wisconsin. Delaware and Maine were the only states in which thunder-storms were not reported during the month. West of the Rocky Mountains thunder-storms were reported as follows: Arizona, 1st, 10th, 11th, 15th, 22d, and 23d; California, 18th and 23d; Colorado, 1st, 19th to 24th, 26th and 30th; Idaho, 30th; Nevada, 26th, 29th, and 30th; New Mexico, 15th, 16th, 18th to 21st, 24th, 27th, and 29th; Utah, 22d, 23d, and 24th; Washington, 11th and 25th; Wyoming, 19th, 21st, 22d, and 30th. There were no states or territories west of the Rocky Mountains in which thunder-storms were not reported.

MISCELLANEOUS PHENOMENA.

DROUGHT.

Rain on the 28th broke the drought which had prevailed in the vicinity of Savannah, Ga., during the last three months. The long drought in the Rio Grande Valley was broken by heavy rain on the 17th. The prevailing drought in the vicinity of Key West, Fla., was beginning to be severely felt at the close of the month. Reports from Huron, S. Dak., state that the continued drought was damaging sprouting grain, and that rain was badly needed in that section.

HALOS.

Solar and lunar halos were reported in New England and the middle Atlantic states on twenty-four dates; 75 per cent. of the halos were attended on the first day, 71 per cent. were followed on the second day, and 67 per cent. were followed on

the third day by rain or snow. In the south Atlantic states halos were reported on thirteen dates; 62 per cent. of the halos were attended on the first day, 70 per cent. were followed on the second day, and 46 per cent. were followed on the third day by rain. In the Gulf States halos were reported on thirteen dates; 62 per cent. of the halos were attended on the first day, 54 per cent. were followed on the second day, and 46 per cent. were followed on the third day by rain. In the Mississippi and Ohio valleys halos were reported on twenty-three dates; 74 per cent. of the halos were attended on the first day, 74 per cent. were followed on the second day, and 65 per cent. were followed on the third day by rain or snow. In the Lake region halos were reported on twenty-one dates; 67 per cent. of the halos were attended on the first day, 62 per cent. were followed on the second day, and 67 per cent. were followed on

the third day by rain or snow. In the Missouri Valley halos were reported on eighteen dates; 61 per cent. of the halos were attended on the first day, and 61 per cent. were followed on the second and third days by rain or snow. In the Rocky Mountain and plateau regions halos were reported on thirteen dates; 38 per cent. of the halos were attended on the first day, 46 per cent. were followed on the second day, and 38 per cent. were followed on the third day by rain or snow. On the Pacific coast halos were reported on thirteen dates; 38 per cent. of the halos were attended on the first day, 38 per cent. were followed on the second day, and 54 per cent. were followed on the third day by rain or snow. In New England and the middle Atlantic states, the Gulf States, and the Rocky Mountain and plateau regions 46 per cent. of the halos occurred in advance of, and 54 per cent. following, low pressure storms. In the south Atlantic states 62 per cent. of the halos occurred in advance of, and 38 per cent. following, low pressure storms. In the Mississippi and Ohio valleys 61 per cent. of the halos occurred in advance of, and 39 per cent. following, low pressure storms. In the Lake region 57 per cent. of the halos occurred in advance of, and 43 per cent. following, low pressure storms. In the Missouri Valley 78 per cent. of the halos occurred in advance of, and 22 per cent. following, low pressure storms. On the Pacific coast 15 per cent. of the halos occurred in advance of, and 85 per cent. following, low pressure storms.

PARHELIA.

At Milwaukee, Wis., parhelia were observed on the 1st at 9 a. m. Very bright spots exhibiting the prismatic colors appeared on each side, and equally distant about 20° from the sun, and nearly in the zenith was a segment of a circle showing the prismatic colors, with the convex side towards the sun. The parhelia lasted until 10.30 a. m. On the 1st high barometric pressure and fair weather prevailed over the region about Milwaukee. No rain fell on the 2d. On the 3d general rain prevailed over the Lake region. At Chicago, Ill., parhelia were observed at 9 p. m. of the 5th. A bright streak of light extended about 5° on each side of the moon and at right angles to the horizon. On a line parallel to the horizon were two spots, one on either side of the moon. The spots were small and highly colored, exhibiting the prismatic colors, and lasted about one hour. On the 5th high barometric pressure and fair weather prevailed over this region, which conditions were followed on the 6th and 7th by general rain.

METEORS.

Meteors of unusual brilliancy were not reported during the month. Meteors were reported as follows: 1st, Rugby, Tenn. 2d, Potsdam, N. Y.; Eagle's Mere, Pa. 5th, Vevay, Ind.; Rugby, Tenn. 6th, State College, Pa. 11th, Vevay, Ind.; Ohio State University, Ohio. 13th, Mantanzas, Fla.; Nashville and Rugby, Tenn. 16th, Detroit, Mich.; Cockrell, Ill. 17th, Fort Sully, S. Dak. 19th, Lacon, Ill.; Kansas City, Kans.; Kalamazoo, Mich.; Ozark, Mo. 20th, Vevay, Ind.; Barren Creek Springs, Md. 21st, Raleigh, N. C.; Ohio State University, Ohio. 22d, Leicester, Mass. 23d, Mount Angel, Oregon. 24th, Monticello, Iowa. 25th, Leicester, Mass. 28th, Coopersburgh, Pa. 30th, Mount Angel, Oregon; Taylor's Ranch, Utah.

MIRAGE.

Mirage were observed during the month as follows: 1st, Rolling Green, Minn. 3d, Hampton, Iowa. 6th, Saint Vincent, Minn. 11th, Woonsocket, S. Dak. 14th and 15th, Green Bay, Wis. 17th and 18th, Webster, S. Dak. 23d, Powder River, Mont. 25th, Woonsocket, S. Dak. 27th, Webster, S. Dak. 29th, Rolling Green, Minn.

Saint Vincent, Minn., 6th: the morning was perfectly clear in the east, and a remarkably beautiful sunrise showed a mirage, or what might more properly be termed a "looming." The ground, looking in an easterly direction, appeared to be lifted up several hundred feet, and objects such as trees, telegraph poles, etc., were plainly brought to view which on other occasions would be entirely shut off by the intervening rise of ground. A small one-story house estimated to be twenty-

five miles distant was plainly visible, and the smoke issuing from the chimney was also discernible. The phenomenon lasted from 8 a. m. to 9.30 a. m., when the eastern sky became obscured with cirrus-stratus clouds.

Green Bay, Wis.: a mirage was observed over the bay from 2 p. m. to 4 p. m., 14th. The horizon appeared much elevated, having the appearance of a long slope, and long stretches of shore on both sides of the bay were visible. The bay seemed one vast ice field with occasional stretches of clear water, although it was open as far as the eye could reach with the assistance of a good field-glass. A similar mirage was observed on the following day at about the same time, with the exception that there appeared to be more open water than on the previous day.

PRAIRIE AND FOREST FIRES.

Prairie fires were reported at Fort Sill, Ind. T., on the 11th, 16th, 28th, and 29th; at Fort Buford, N. Dak., on the 10th, 11th, 15th to 19th, 29th, and 30th; at Fort Sully, S. Dak., on the 10th, 12th, 13th, and 18th; at Fort Yates, S. Dak., on the 14th; at Wolsey, S. Dak., on the 9th and 10th; and brush fires were reported at La Crosse, Wis., 11th, 12th, and 13th.

Forest fires were reported near Plainfield, Conn., Concord, N. H., and Lakewood, N. J., on the 18th; near Southport, N. C., from the 12th to 15th; near Wilmington, N. C., 12th; and near Rapid City, S. Dak., on the 11th, 16th, 28th, and 29th.

SUN SPOTS.

Haverford College Observatory, Pa. (observed by Prof. F. P. Leavenworth):

Date.	Number of new—		Disappeared by solar rotation.		Reappeared by solar rotation.		Total number visible.		Faculae.	Remarks.
	Groups.	Spots.	Groups.	Spots.	Groups.	Spots.	Groups.	Spots.		
March, 1890.										
3, 11 a. m.	0	0	0	0	0	0	0	0	1	Definition poor
4, 12 m.	1	0	0	0	0	0	1	5	0	Definition good.
5, 12 m.	0	0	0	0	0	0	1	5	0	Definition fair.
6, 4 p. m.	0	0	0	0	0	0	1	5	0	Definition fair.
7, 12 m.	0	0	0	0	0	0	1	5	0	Definition poor; three large spots.
8, 10 a. m.	0	0	0	0	0	0	1	10	0	Definition poor.
9, 5 p. m.	0	0	0	0	0	0	1	18	0	Definition fair; all small.
10, 10 a. m.	0	0	0	0	0	0	1	9	0	Definition poor; through clouds.
12, 11 a. m.	0	0	0	0	0	0	1	3	2	Definition fair.
13, 2 p. m.	0	0	0	0	0	0	1	3	2	Definition fair.
15, 3 p. m.	0	0	1	3	0	0	0	0	2	Definition fair.
16, 10 a. m.	0	0	0	0	0	0	0	0	3	Definition fair.
17, 10 a. m.	0	0	0	0	0	0	0	0	1	Definition fair.
18, 10 a. m.	0	0	0	0	0	0	0	0	3	Definition good.
20, 12 m.	0	0	0	0	0	0	0	0	1	Definition fair.
21, 3 p. m.	0	0	0	0	0	0	0	0	1	Definition fair.
23, 9 a. m.	0	0	0	0	0	0	0	0	0	Definition poor.
24, 10 a. m.	0	0	0	0	0	0	0	0	0	Definition poor.
26, 9 a. m.	0	0	0	0	0	0	0	0	2	Definition fair.
27, 11 a. m.	0	0	0	0	0	0	0	0	0	Definition poor; through clouds.
28, 12 m.	0	0	0	0	0	0	0	0	2	Definition good.
29, 10 a. m.	0	0	0	0	0	0	0	0	0	Definition poor.
30, 2 p. m.	0	0	0	0	0	0	0	0	0	Definition good.
April, 1890.										
1, 10 a. m.	0	0	0	0	0	0	0	0	1	Definition good.
2, 10 a. m.	0	0	0	0	0	0	0	0	0	Definition fair.
3, 10 a. m.	0	0	0	0	0	0	0	0	0	Definition poor.
4, 3 p. m.	0	0	0	0	0	0	0	0	0	Definition fair.
5, 9 a. m.	0	0	0	0	0	0	0	0	2	Definition good.
6, 10 a. m.	0	0	0	0	0	0	0	0	1	Definition fair.
7, 10 a. m.	0	0	0	0	0	0	0	0	1	Definition fair.
10, 9 a. m.	0	0	0	0	0	0	0	0	2	Definition good.
11, 12 m.	2	10	0	0	0	0	2	10	3	Definition fine; all small.
12, 10 a. m.	0	8	0	0	0	0	2	18	3	Definition fine.
13, 10 a. m.	0	0	0	0	0	0	2	11	3	Definition fine.
14, 10 a. m.	0	0	0	0	0	0	0	0	1	Definition good.
15, 11 a. m.	0	0	0	0	0	0	0	0	0	Definition very poor.
16, 9 a. m.	1	3	0	0	0	0	1	3	0	Definition fair; small.
17, 12 m.	0	0	0	0	0	0	0	0	2	Definition fair.
18, 5 p. m.	0	0	0	0	0	0	0	0	0	Definition fair.
19, 11 a. m.	0	0	0	0	0	0	0	0	0	Definition poor.
20, 12 m.	0	0	0	0	0	0	0	0	0	Definition fair.
21, 10 a. m.	0	0	0	0	0	0	0	0	0	Definition fair.
22, 10 a. m.	0	0	0	0	0	0	0	0	0	Definition poor.
23, 10 a. m.	0	0	0	0	0	0	0	0	0	Definition good.
28, 9 a. m.	1	3	0	0	0	0	1	3	0	Definition good; small.
29, 10 a. m.	0	10	0	0	0	0	1	19	0	Definition fine.
30, 11 a. m.	0	0	0	0	0	0	1	11	0	Definition fair.

Mr. C. E. Buzzell, Leaf River, Ill.: April 10th, one small group five days in, increasing on 11th, and disappeared on the 12th. 11th, small group, new, two days past meridian, in view on 12th; clouds, 13th, with clear disc on 14th. 28th, one small group observed through clouds. 29th, good definition, two small groups in north latitude two days west of meridian, with a trail of smaller spots connecting them; all were unchanged on the 30th, with clear disc on May 1st.

Mr. John W. James, Riley, Ill.: none seen until 29th, then a group of small spots, about one-half day past sun's meridian.

Mr. M. A. Veeder, Lyons, N. Y.: 1st and 2d, faculae appeared by rotation, spots forming in their vicinity on 10th, and fading out again by 14th, the faculae alone being seen on the eastern limb, 15th. Faint faculae near the eastern limb, 5th and 11th. On the 22d faculae appeared by rotation, and on the 28th spots had formed in their vicinity, continuing with many changes until the end of the month. Observations were poor or lacking on 4th, 8th, 9th, 13th, 23d, and 27th.

H. D. Govey, North Lewisburgh, Ohio: sun spots were observed on the 12th and 30th.

VERIFICATIONS.

FORECASTS FOR 24 HOURS IN ADVANCE.

[Verifications made by Assistant Professor C. F. Marvin, assisted by Mr. H. E. Williams, chief clerk of the Forecast Division.]

The forecasts for districts east of the Rocky Mountains for April, 1890, were made by 1st Lieutenant Richard E. Thompson, 6th Infantry, Signal Officer, and those for the Pacific coast districts were made at San Francisco, Cal., by 2d Lieutenant J. E. Maxfield, Signal Corps.

Percentages of forecasts verified, April, 1890.

States.		States.	
Maine.....	74.8	Kentucky.....	82.1
New Hampshire.....	72.7	Ohio.....	74.9
Vermont.....	73.9	West Virginia.....	76.9
Massachusetts.....	76.4	Indiana.....	80.5
Rhode Island.....	75.5	Illinois.....	83.0
Connecticut.....	73.1	Lower Michigan.....	80.0
Eastern New York.....	81.1	Upper Michigan.....	78.6
Western New York.....	78.9	Wisconsin.....	78.5
Eastern Pennsylvania.....	78.0	Minnesota.....	80.1
Western Pennsylvania.....	77.5	Iowa.....	80.7
New Jersey.....	76.7	Kansas.....	71.2
Delaware.....	76.5	Nebraska.....	76.6
Maryland.....	77.1	Missouri.....	70.9
District of Columbia.....	78.2	Colorado.....	81.2
Virginia.....	79.7	North Dakota.....	85.9
North Carolina.....	80.3	South Dakota.....	85.3
South Carolina.....	80.2	Southern California*.....	87.7
Georgia.....	77.7	Northern California*.....	85.1
Eastern Florida.....	85.0	Oregon*.....	81.7
Western Florida.....	83.9	Washington*.....	75.9
Alabama.....	82.9	By elements: Weather.....	83.5
Mississippi.....	79.9	Temperature.....	71.7
Louisiana.....	77.3	Monthly percentage of weather and	
Texas.....	78.9	temperature combined.....	78.8
Arkansas.....	78.9		
Tennessee.....	79.5		

* In determining the monthly percentage of weather and temperature combined, the Pacific coast states are not included. † The forecasts of temperature in districts east of the Rocky Mountains for April, 1890, were made with reference to the maximum temperature alone; that is, a prediction of warmer or cooler indicated that the maximum temperature of the day designated would be higher or lower than the maximum of the previous day. ‡ The monthly percentage of weather and temperature combined is determined by multiplying the percentage of weather by 6, and the percentage of temperature by 4, and dividing their sum by 10.

FORECASTS FOR 48 HOURS IN ADVANCE.

Appreciating the great importance that long time predictions possess for the general public the Chief Signal Officer has authorized forecasts for forty-eight and seventy-two hours, cov-

ering the second and third days in advance. Such forecasts are optional with the predicting officer, and are only made when clearly in the public interest, and cover, in all cases, considerable areas of country, and are not confined to localities.

Percentages of verifications of forecasts made for second day in advance. Number of predictions made: weather, 86; temperature, 42. Percentages of verifications: weather, 86.9; temperature, 77.4. Weather and temperature combined, 84.3. No forecasts for seventy-two hours were made during the month.

CAUTIONARY SIGNALS FOR APRIL, 1890.

Statement showing percentages of justifications of wind signals for the month of April, 1890:

Wind signals.—(Ordered by Lieutenant Richard E. Thompson.) Total number of signals ordered, sixty-nine; justified as to velocity, wholly, forty-three, partly, two; justified as to direction, sixty-six. Of the signals ordered, fifty-five were cautionary signals, of which thirty-four were wholly, and one partly justified, and fourteen were storm signals, of which nine were wholly, and one partly justified. Thirty-four signals were ordered for easterly winds, of which thirty-three were justified, and thirty-five were ordered for westerly winds, of which thirty-three were justified. Percentage of justifications, 68.0.

Cold-wave signals.—(Ordered by Assistant Professor T. Russell.) Total number of signals ordered, thirty-three; justified, thirteen. Percentage of justifications, 39.4.

Percentages of verifications of weather and temperature signals reported by directors of the various State Weather Services for April, 1890.

States.	Weather.	Temperature.	States.	Weather.	Temperature.
Illinois.....	82.0	76.6	Nebraska.....	84.9	87.2
Indiana.....	79.0	83.0	New Jersey.....	87.5	88.8
Kansas.....	82.6	84.2	New York.....	86.5	85.2
Kentucky.....	91.0	90.0	Ohio.....	82.0	88.0
Michigan.....	88.5	85.5	Pennsylvania.....	83.0	89.0
Minnesota.....	74.0	76.0	South Carolina.....	84.9	90.6
Missouri.....	76.0	78.0			

STATE WEATHER SERVICES.

[Temperature in degrees Fahrenheit; precipitation, including melted snow, in inches and hundredths.]

The following extracts and summaries are republished from reports for April, 1890, of the directors of the various state weather services:

ALABAMA.

Temperature.—Highest monthly mean, 68.8, at Citronelle; lowest monthly mean, 61.5, at Valley Head; maximum, 89, at Wiggins, 15th; minimum, 31, at Elkmont, 4th and 11th; greatest local monthly range, 53, at Guntersville and Wiggins; least local monthly range, 29, at Union Springs.

Precipitation.—Greatest monthly, 5.94, at Carrollton; least monthly, 1.20, at Mount Willing.

Wind.—Prevailing direction, southwest.—P. H. Mell, Signal Corps, Auburn, director.

ARKANSAS.

Temperature.—The average was about 2 below the normal; maximum, 93,

at Lead Hill; minimum, 33, at Ozone. A number of stations reported light frost on the 10th; no damage except to delicate plants.

Precipitation.—The average was 6.61 in excess of the normal of the past three years; greatest monthly, 12.95, at Hot Springs; least monthly, 5.71, at Lead Hill.—M. F. Locke, Commissioner of Agriculture, Little Rock, director; W. U. Simons, Sergeant, Signal Corps, assistant.

COLORADO.

Temperature.—The mean was about 0.5 below the normal; highest monthly mean, 53.9, at Fruita; lowest monthly mean, 25.9, at Climax; maximum, 88, at Lamar, 11th; minimum, —3, at Climax, 8th; greatest local monthly range, 69, at Thon; least local monthly range, 41, at Alma.

Precipitation.—The average was about the normal of the last four years; greatest monthly, 5.59, at Kirk; least monthly, 0.08, at Villa Grove.

Wind.—Prevailing directions, west and south.—*Prof. F. H. Loud, Colorado Springs, director; W. S. Miller, Sergeant, Signal Corps, assistant.*

ILLINOIS.

Temperature.—The mean was 1.4 above the normal of the last fifteen years; highest monthly mean, 58.6, at Golconda; lowest monthly mean, 44.1, at Lake Forest; maximum, 92, at Mascoutah, 8th; minimum, 15, at Sycamore, 1st; greatest monthly range, 70, at Mascoutah; least monthly range, 48, at Golconda, Cockrell, Martinsville, Olney, and Winnebago.

Precipitation.—Greatest monthly, 8.20, at Mascoutah; least monthly, 1.69, at Lacon.

Wind.—Prevailing direction, northeast.—*John Craig, Sergeant, Signal Corps, Springfield, in charge.*

INDIANA.

Temperature.—The mean was 1.1 above the normal; highest monthly mean, 59.4, at Huntingburgh; lowest monthly mean, 45.9, at Point Isabel; maximum, 85, at Marengo, 8th and 13th; minimum, 20, at Delphi, 1st; greatest local monthly range, 60, at Point Isabel; least local monthly range, 43, at De Gonia Springs.

Precipitation.—The average precipitation was 1.30 above the normal; greatest monthly, 8.80, at Marengo; least monthly, 2.66, at Cannelton.

Wind.—Prevailing direction, northeast.—*Prof. H. A. Huston, La Fayette, director; C. F. R. Wappenhans, Sergeant, Signal Corps, assistant.*

IOWA WEATHER CROP BULLETIN SERVICE.

Temperature.—Highest monthly mean, 57.5, at Glenwood; lowest monthly mean, 48.0, at Wesley; maximum, 88, at Sioux City, 11th, and at Clarinda, 30th; minimum, 2, at Wesley, 1st; greatest local monthly range, 79, at Wesley; least local monthly range, 44, at Iowa City.

Precipitation.—Greatest monthly, 4.46, at Manson; least monthly, 0.38, at Glenwood.

Wind.—Prevailing direction, southeast.—*G. M. Chappel, Sergeant, Signal Corps, Des Moines, in charge, Iowa Weather Crop Bulletin Service.*

KANSAS.

Temperature.—The mean was 1.7 above the normal, the greatest excess occurring in the northeastern counties where it was 3.3, and the least excess in Sumner county where it was 0.2; highest monthly mean, 59.7, at Sedan; lowest monthly mean, 48.6, at Sharon Springs and Mankato; maximum, 98, at Kanopolis, 11th; minimum, 20, at Hoxie, 1st; greatest local monthly range, 71, at Burr Oak; least local monthly range, 35, at La Harpe; greatest daily range, 63, at Ellis, 7th; least daily range, 2, at Dodge City, 16th.

Precipitation.—The precipitation was 1.06 deficient in the eastern division; 1.00 in the middle division; in the western division there was an excess of 2.00; greatest monthly, 6.60, at Lakin; least monthly, 0.24, at Dorrance.

Wind.—Prevailing direction, northeast.—*Prof. J. T. Lovewell, Topeka, director; T. B. Jennings, Sergeant, Signal Corps, assistant.*

KENTUCKY.

Temperature.—The average temperature was about the same as the normal; highest monthly mean, 62.4, at Bowling Green; lowest monthly mean, 50.9, at Owenton; maximum, 92, at Bowling Green, 30th; minimum, 27.5, at Frankfort, 11th; greatest monthly range, 57.2, at Frankfort; least monthly range, 39, at Millersburgh.

Precipitation.—The average was about one-half inch less than the normal; greatest monthly, 5.44, at Millersburgh; least monthly, 3.31, at Pellville.

Wind.—Prevailing direction, south.—*Dr. E. A. Grant, Louisville, director; Frank Burke, Sergeant, Signal Corps, assistant.*

LOUISIANA.

Temperature.—The temperature averaged 0.5 above the normal; highest monthly mean, 70.8, at Cheneyville; lowest monthly mean, 64.0, at Grand Cane; maximum, 89, at Liberty Hill, 30th, at Cheneyville, 2d, and at Cameron, 14th and 15th; minimum, 37, at Liberty Hill, 10th; greatest local monthly range, 52, at Liberty Hill; least local monthly range, 28, at New Orleans.

Precipitation.—The precipitation averaged 2.50 above the normal for the month; greatest monthly, 16.85, at Columbia; least monthly, 2.11, at Houma.

Wind.—Prevailing direction, southeast.—*R. E. Kerkam, Sergeant, Signal Corps, New Orleans, in charge.*

MICHIGAN.

Temperature.—The temperature was above the normal in each section, from 0.1 in the central section to 1.8 in the northern section; highest monthly mean, 50.0, at Benton Harbor; lowest monthly mean, 32.7, at Atlantic; maximum, 81, at Weldon Creek, 12th; minimum, 1, at several stations, 1st; greatest local monthly range, 72, at Crystal Falls; least local monthly range, 34, at Atlantic; greatest daily range, 51, at Crystal Falls, 21st; least daily range, 2, at Cheboygan, 13th.

Precipitation.—The average was 0.57 above the normal of the past fifteen years; it was above the normal in all sections, except in the west half of the upper peninsula, where it was about 0.50 below; greatest monthly, 5.55, at Chelsea; least, 0.85, at Crystal Falls.

Wind.—Prevailing direction, northeast.—*N. B. Conger, Sergeant, Signal Corps, Lansing, director.*

MINNESOTA.

Temperature.—The month was warmer than usual throughout the state; highest monthly mean, 50.3, at Mankato; lowest monthly mean, 40.6, at Duluth; maximum, 84, at Medford, 11th; minimum, -17, at Pokegama Falls,

1st; greatest local monthly range, 88, at Pokegama Falls; least local monthly range, 51, at Duluth; greatest daily range, 51, at Moorhead, 29th; least daily range, 3, at Duluth, 18th.

Precipitation.—The precipitation was slightly in excess in the upper part of the Red River Valley, while at Moorhead, in the lower part, it was deficient by 2.21; elsewhere in the state it was deficient by 20 per cent.; greatest monthly, 2.95, at Rolling Green; least monthly, 0.19, at Moorhead.

Wind.—Prevailing direction, south.—*John Healy, Corporal, Signal Corps, Saint Paul, in charge.*

MISSISSIPPI.

Temperature.—The mean was about 0.8 above the normal; highest monthly mean, 70.4, at Moss Point; lowest monthly mean, 51.5, at Lake; maximum, 93, at Columbus, 15th; minimum, 34, at Lake, 10th.

Precipitation.—The average was about 1.08 below the normal; greatest monthly, 11.01, at Greenville; least monthly, 0.62, at Kosciusko.

Wind.—Prevailing direction, south.—*R. B. Fulton, Signal Corps, University, director.*

MISSOURI.

Temperature.—Highest monthly mean, 62.3, at Proteem; lowest monthly mean, 51.2, at Kirksville and Warrensburg; maximum, 93, at Proteem; minimum, 25, at Conception.

Precipitation.—Greatest monthly, 7.00, at Ironton; least monthly, 0.00, at Langdon and Craig.—*Prof. Francis E. Nipher, Saint Louis, director.*

METEOROLOGICAL REPORT OF THE MISSOURI STATE BOARD OF AGRICULTURE.

Temperature.—Highest monthly mean, 60.2, at Ozark; lowest monthly mean, 53.9, at Conception; maximum, 92, at Hannibal, 8th, at Liberty, 30th, and at Willow Springs, 9th; minimum, 25, at Conception, 1st; greatest local monthly range, 65, at Liberty; least local monthly range, 44, at Cairo, Ill.

Precipitation.—Greatest monthly, 7.00, at Kansas City; least monthly, 1.03, at Conception.

Wind.—Prevailing direction, northeast.—*Levi Chubbuck, Secretary of State Board of Agriculture, Columbia, director; A. L. McKee, Sergeant, Signal Corps, assistant.*

NEBRASKA.

The month has been decidedly warm and dry; the mean temperature was 4.0 above the normal, and the precipitation about one-half the usual amount.

Temperature.—Highest monthly mean, 58.0, at Howe; lowest monthly mean, 45.5, at Hay Springs; maximum, 94, at Wilcox; minimum, 7, at Fort Niobrara.

Precipitation.—The region of the greatest rainfall was the extreme southwest corner of the state, and next to this the southeastern. A narrow strip along the lower Platte and thence south to Franklin received less than one inch. A considerable fall of snow occurred in the northern part of the state.

Wind.—Prevailing direction, north.—*Prof. Goodwin D. Swezey, Crete, director; G. A. Loveland, Sergeant, Signal Corps, assistant.*

NEVADA.

Temperature.—The mean was slightly below the normal; highest monthly mean, 70.6, at El Dorado Canyon; lowest monthly mean, 37.2, at Ruby Hill; maximum, 96, at El Dorado Canyon, 28th; minimum, 8, at Ruby Hill, 1st; greatest monthly range, 72, at Elko; least monthly range, 33.0, at Ely.

Precipitation.—Greatest monthly, 2.60, at Ruby Hill; least monthly, 0.00, at Genoa and Sodaville.

Wind.—Prevailing direction, south.—*Prof. Chas. W. Friend, Carson City, director; H. E. Wilkinson, Corporal, Signal Corps, assistant.*

NEW ENGLAND METEOROLOGICAL SOCIETY.

Neither the temperature nor the amount of precipitation varied to any marked degree from the average of the month for previous years. There was a slight excess in precipitation in the south, but a general deficiency in the north, making a general average of 0.73 below the normal.

Temperature.—Highest monthly mean, 48.7, at Springfield; lowest monthly mean, 36.0, at Berlin Falls; maximum, 80, at Deerfield, 13th; minimum, 6, at West Milan, 2d; greatest local monthly range, 68, at West Milan; least local monthly range, 28, at Nantucket; greatest daily range, 53, at Berlin Mills; 23d; least daily range, 0, at Nahant, 9th.

Precipitation.—Greatest monthly, 4.99, at Uncasville; least monthly, 1.14, at West Milan.

Wind.—Prevailing direction, northwest.—*Prof. William H. Niles, Boston, Mass., president; Prof. Winslow Upton, Providence, R. I., secretary; J. Warren Smith, Private, Signal Corps, assistant.*

NEW JERSEY.

Temperature.—The mean was 2.5 above the normal; highest monthly mean, 53.3, at Oceanic; lowest monthly mean, 48.0, at Atlantic City; maximum, 86, at Readington, 13th and 14th; minimum, 21, at Egg Harbor City, 2d; greatest local monthly range, 60, at Beverly and Egg Harbor City; least local monthly range, 45, at Asbury Park; greatest daily range, 50, at Beverly, 13th; least daily range, 2, at Lambertville, 9th, 10th, and 25th.

Precipitation.—The average was 0.82 below the normal; greatest monthly, 4.58, at Egg Harbor City; least monthly, 1.89, at Locktown.

Wind.—Prevailing directions, northwest and southwest.—*E. W. McGann, Sergeant, Signal Corps, New Brunswick, in charge.*

NEW YORK.

Temperature.—The temperature was above the normal at all stations of the state, excepting those in the northern Champlain and Saint Lawrence valleys

and in the lower Hudson valley; maximum, 84, at Geneva, 12th; minimum, 5, at Sherman, 2d; greatest local monthly range, 67, at Wedgwood; least local monthly range, 40, at Buffalo.

Precipitation.—The precipitation was generally above the average in all sections of the state, excepting in the Champlain and Hudson valleys, on Long Island, and through a section extending from the central lake region along Lake Ontario to the upper Saint Lawrence valley.

Wind.—Prevailing direction, northwest.—*Prof. E. A. Fuertes, Ithaca, director; I. W. Brewer, Private, Signal Corps, assistant.*

NORTH CAROLINA.

Notwithstanding some damage by frost, the weather during the month was generally favorable for crops.

Temperature.—The temperature was 0.5 above the normal; highest monthly mean, 62.4, at Chattanooga, Tenn.; lowest monthly mean, 54.2, at Marion, Va.; maximum, 88, at Chapel Hill, Winslow, and Washington, 14th; minimum, 25, at Douglas, 2d; greatest local monthly range, 62, at Douglas; least local monthly range, 30, at Hatteras.

Precipitation.—The average for the state was 1.76 below the normal; greatest monthly, 4.31, at Washington; least monthly, 1.40, at Winslow.

Wind.—Prevailing direction, southwest.—*Dr. Herbert B. Battle, Raleigh, director; C. F. von Herrmann, Sergeant, Signal Corps, assistant.*

NORTH AND SOUTH DAKOTA.

Temperature.—The temperature for the state was about 6.4 above the normal; highest monthly mean, 52.3, at Wahpeton, S. Dak.; lowest monthly mean, 41.0, at Aberdeen, S. Dak.; maximum, 89, at Aberdeen, S. Dak., 30th; minimum, 8, at Rapid City, S. Dak., 1st; greatest local monthly range, 79, at Aberdeen, S. Dak.; least local monthly range, 55, at Etta Mine, S. Dak.

Precipitation.—The precipitation was 1.56 below the normal; greatest monthly, 2.12, at Canton, S. Dak.; least monthly, 0.10, at Davenport, N. Dak.

Wind.—Prevailing direction, southeast.—*S. W. Glenn, Sergeant, Signal Corps, Huron, S. Dak., in charge.*

OHIO.

Temperature.—The mean of the northern section, the middle section, the southern section, and of state was 1.4, 1.4, 1.7, and 1.5, respectively, above the averages for the sections and state; maximum, 86, at Portsmouth, 8th; minimum, 20, at Youngstown, 2d, and at Findlay on the 10th; greatest daily range of temperature, 49.5, at Yellow Springs, 11th; least daily range, 3.0, at New Alexandria, 24th.

Precipitation.—The means for the northern and middle sections were 1.39 and 0.86 above the averages for the sections, respectively, while the mean for the southern section was 0.22 below the average, and the mean for the state was 0.68 above the average for April; greatest monthly, 6.30, at Bellevue; least monthly, 1.68, at Wapakoneta.

Wind.—Prevailing direction, northeast.—*Prof. B. F. Thomas, Columbus, director; Lieut. Charles E. Kilbourne, secretary; C. M. Strong, Corporal, Signal Corps, assistant.*

OREGON.

The first two decades were cool and the third warm; the frost on the 11th and 12th injured the peach crop.

Temperature.—The mean was 0.2 above the normal; highest monthly mean, 53.2, at Hood River; lowest monthly mean, 44.0, at Joseph; maximum, 89, at Pendleton; minimum 10, at Silver Lake.

Precipitation.—The average was 1.68 below the normal; greatest monthly, 2.87, at Ellensburg; least monthly, 0.11, at North Powder. A trace of snow fell in the valleys of western Oregon, and from trace to 7.5 on the higher elevations and in the mountainous districts.

Wind.—Prevailing direction, southwest.—*Hon. H. E. Hayes, Master State Grange, Onego, director; B. S. Pague, Sergeant, Signal Corps, assistant.*

PENNSYLVANIA.

Temperature.—The mean temperature was 3 above the normal; highest monthly mean, 58.7, at Annville; lowest monthly mean, 43.4, at Dyberry and Philipsburgh; maximum, 85, at Lewistown and Lyndport, 12th; minimum, 12, at Charlesville and Columbus, 1st; greatest local monthly range, 44.1, at Somerset; least local monthly range, 16.7, at Eagle's Mere; greatest daily range, 60, at Ligonier, 17th; least daily range, 1, at Annville, 25th.

Precipitation.—The average was about 0.75 above the normal; greatest monthly, 5.50, at Blue Knob; least monthly, 1.75, at Lyndport.

Wind.—Prevailing direction, northwest.—*Under direction of the Franklin Institute, Philadelphia; T. F. Townsend, Sergeant, Signal Corps, assistant.*

SOUTH CAROLINA.

The temperature was about normal. Frost on the 11th and 21st damaged corn, cotton, potatoes, and fruit. The precipitation was about the average.

Temperature.—Highest monthly mean, 66.9, at Hardeeville; lowest monthly mean, 58.9, at Camden; maximum, 91, at Hardeeville, 15th; minimum, 31, at Spartanburgh, 21st; greatest local monthly range, 57, at Spartanburgh; least monthly range, 37, at Timmonsville.

Precipitation.—Greatest monthly, 3.45, at Walhalla; least monthly, 1.10, at Winnsborough.

Wind.—Prevailing direction, southwest.—*Hon. A. P. Butler, Columbia, director; J. W. Cronk, Private, Signal Corps, assistant.*

TENNESSEE.

The month was noted for its large percentage of cloudiness and rainfall.

Temperature.—The mean was slightly above the normal of the last eight years; highest monthly mean, 63.0, at Kingston Springs; lowest monthly mean, 57.1, at Greeneville; maximum, 86, at Chattanooga, 8th, and at Waynes-

borough, 14th; minimum, 31, at Greeneville, Andersonville, Jacksboro, and Trenton, 11th; greatest local monthly range, 50, at Springdale; least local monthly range, 36, at Florence Station; greatest daily range, 44, at Hohenwald, 11th; least daily range, 4, at Knoxville, 17th, and at Milan, 23d.

Precipitation.—The average was slightly in excess of the normal of the last eight years; greatest monthly, 7.47, at Covington; least monthly, 1.94, at Grief.

Wind.—Prevailing direction, south.—*J. D. Plunket, M. D., Nashville, director; H. C. Bate, Signal Corps, assistant.*

TEXAS.

Temperature.—The temperature for the month varied but little from the normal; in the vicinity of the coast the departure was 1 below, while over other portions of the state it was from 1 to 4 above the normal; highest monthly mean, 76.5, at Rio Grande City; lowest monthly mean, 50.9, at Panhandle; maximum, 97, at Rio Grande City, 8th and 25th; minimum, 22, at Panhandle, 1st; greatest local monthly range, 62, at Colorado City and Fort Elliott; least local monthly range, 30, at Corpus Christi and La Grange.

Precipitation.—The precipitation for the month ranged from 3.00 to 8.00 in excess of the normal, except over the extreme western portion, where about the normal amount fell; greatest monthly, 13.60, at Gainesville; least monthly, 0.06, at El Paso.—*D. D. Bryan, Galveston, director; I. M. Cline, Sergeant, Signal Corps, assistant.*

Meteorological record of Army post surgeons, voluntary, and other co-operating observers, April, 1890.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean.			Max.	Min.	Mean.	
Alabama.	0	0	0	Ins.	California—Cont'd.	0	0	0	Ins.
Bermuda *†.....	82	41	64.8	3.00	Barstow †.....	91	38	63.2	0.07
Butler.....	43	43	60.1	5.12	Benicia Barracks.....	83	42	56.4	1.04
Citronelle.....	48	48	68.8	3.08	Berkeley.....	77	41	53.5	2.18
Columbiana †.....	55	36	64.7	5.17	Centerville *.....	89	53	62.9	1.12
Decatur (1) †.....	.....	.....	.....	4.72	Colegrove.....	.....	.....	.....	0.21
Decatur (2) †.....	.....	.....	.....	3.15	Crescent City.....	.....	.....	.....	4.07
Double Springs *.....	51	36	63.4	5.86	Evergreen.....	.....	.....	.....	0.74
Elkmont.....	81	31	60.8	4.40	Fort Bidwell.....	77	20	47.8	0.92
Evergreen †.....	.....	.....	.....	1.85	Fort Gaston.....	85	31	55.6	2.94
Florence.....	85	41	61.8	3.25	Fort Mason.....	78	41	53.5	1.22
Gadsden.....	87	43	65.2	3.52	Georgetown.....	78	34	54.2	3.86
Greensborough.....	84	48	61.5	3.16	Grass Valley.....	.....	.....	.....	3.69
Guntersville.....	85	33	59.2†	3.32	Hydesville †.....	70	29	50.2	1.63
Livingston (1).....	85	44	64.7	3.06	Iowa Hill*.....	83	41	55.4	3.02
Mount Willing.....	84	43	66.3	1.20	Jolon.....	80	45	57.4	0.05
Mt. Vernon B'ks.....	86	42	66.4	4.06	Julian.....	80	33	57.4	1.11
Pine Apple†.....	.....	.....	.....	T. ?	La Grange *.....	91	39	59.8	1.45
Tusculum (1).....	85	45	61.6	2.46	Lewis Creek.....	89	42	62.6	T.
Union Springs.....	80	51	68.0	3.28	Los Banos (1) *.....	88	52	63.3	0.02
Uniontown.....	86	45	65.6	2.64	Los Gatos (2).....	.....	.....	.....	1.25
Valley Head †.....	80	42	60.0	3.67	Mendocino.....	63	35	49.6	3.46
Wiggins.....	89	35	67.9	2.25	Oakland (1) *.....	87	42	54.9	1.51
Carrollton.....	84	44	64.5	5.94	Pasadena.....	87	37	59.8	0.54
Alaska.	.....	.....	.....	.....	Placerville*.....	77	33	49.3	3.51
Juneau.....	45	13	34.7	4.94	Presidio of S. F.....	81	38	52.0	1.42
Arizona.	.....	.....	.....	.....	Riverside.....	93	36	58.0	0.06
Ash Creek.....	.....	.....	.....	0.06	Sacramento (1).....	78	35	55.3	1.34
Ash Springs.....	.....	35	62.0	0.72	Salinas (1) *.....	86	42	52.6	0.00
Bangharts.....	.....	.....	.....	2.50	San Diego B'ks.....	84	44	60.2	0.05
Bisbee.....	.....	.....	.....	0.15	Santa Barbara (1).....	88	43	56.6	0.31
Chiri Cahua M't's.....	.....	.....	.....	0.89	Santa Clara *.....	79	37	56.0	0.47
Cooley's Springs†.....	.....	.....	.....	2.35	Santa Maria.....	83	37	57.0	0.10
Dragoon.....	.....	.....	.....	0.32	Sonoma.....	82	39	55.8	1.80
Dos Cabezas.....	.....	.....	.....	0.95	Steeles.....	87	39	56.8	0.30
Eagle Pass.....	.....	35	53.5	0.79	Stockton (1).....	.....	.....	.....	1.08
Florence.....	86	43	68.0	0.68	Susanville* †.....	78	32	48.2	1.06
Fort Apache.....	80	31	53.6	0.51	Upper Mattole.....	82	35	57.2	4.28
Fort Bowie.....	81	33	61.2	0.70	Vacaville (1) *.....	83	46	58.3	1.22
Fort Huachuca.....	83	32	60.1	0.34	Walla Walla Ck.....	70	23	47.2	1.24
Fort Grant.....	79	31	59.0	0.92	Walnut Creek.....	84	40	57.9	0.42
Fort Lowell.....	94	39	65.1	0.75	Wheatland.....	83	39	58.5	1.40
Fort McDowell.....	98	41	67.3	0.55	Colorado.	.....	.....	.....	.....
Fort Mojave.....	98	40	70.0	0.00	Abbott.....	.....	.....	.....	3.02
Fort Verde.....	86	35	58.0	0.90	Agate *.....	74	18	37.0	4.25
Gila Bend*.....	90	52	73.3	0.00	Alma.....	50	9	39.2	4.35
Grand Central Mine.....	.....	.....	.....	0.15	Apishapa.....	83	26	47.6	0.74
Holbrook.....	81	31	55.2	1.01	Aroya.....	.....	.....	.....	2.25
Mount Huachuca.....	92	34	63.6	0.32	Beaver Creek.....	.....	.....	.....	2.90
Natural Bridge.....	.....	.....	.....	1.00†	Bennet.....	85	29	36.2	4.00
Phoenix.....	90	42	64.2	0.51	Boulder Canon.....	.....	.....	.....	3.20
San Carlos.....	90†	37	63.4†	1.11	Box Elder.....	.....	.....	.....	2.08
Show Low.....	.....	.....	.....	1.40	Breckenridge.....	65	0	32.2	2.15
Signal †.....	94	39	66.2	0.16	Brandon.....	.....	.....	.....	2.03
Strawberry.....	.....	.....	.....	0.40	Brush.....	.....	.....	.....	2.38
Teviston.....	.....	.....	.....	3.00†	Byers *.....	82	18	53.2	4.16
Tip Top †.....	.....	.....	.....	0.96	Canon City.....	80	16	53.0	4.16
Tucson (1) †.....	94	41	67.4	0.91	Carlisle.....	.....	.....	.....	5.53
Walnut Grove.....	.....	.....	.....	0.30	Castle Rock.....	78	16	47.4	1.41
Walnut Ranch.....	.....	.....	.....	0.29	Cheyenne Wells *.....	84	24	59.8	1.95
Wilgus.....	.....	.....	.....	1.19	Climax*.....	48	3	25.9	3.50
Arkansas.	.....	.....	.....	.....	Crook.....	.....	.....	.....	2.66
Arkansas City †.....	.....	.....	.....	7.29	Cumbres *.....	53	15	29.6	1.20
Camden †.....	.....	.....	.....	7.97	Deer Trail *.....	78	20	41.6	1.30
Dardanelle.....	.....	.....	.....	15.00	Delta †.....	79	31	47.0	0.96
Forrest City †.....	84	44	65.4	7.93	Denver (Jes. Col.).....	75	18	46.4	2.99
Fulton.....	.....	.....	.....	10.22	Durango (1).....	.....	.....	.....	2.39
Helena (1) †.....	.....	.....	.....	8.55	Durango (2).....	70	20	47.5	2.75
Hot Springs.....	.....	37	.....	12.95	Eagle Farm.....	.....	.....	.....	4.40
Lead Hill.....	93	38	62.4	5.71	Emma.....	.....	.....	.....	0.27†
Little Rock B'ks.....	87	38	62.4	6.44	First View *.....	84	24	51.0	1.73
Newport (1) †.....	.....	.....	.....	10.41	Fort Collins (near).....	.....	.....	.....	4.48
Winslow*.....	75	45	57.4	7.52	Fort Collins.....	78	14	46.5	3.92
California.	.....	.....	.....	.....	Fort Crawford.....	66	21	45.3	1.22
Alcatraz Island.....	71	45	53.2	1.45	Fort Lewis.....	65	12	41.5	3.13
Angel Island.....	81	39	53.0	1.26	Fort Logan.....	80	12	48.7	2.45

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
<i>Colorado—Cont'd.</i>	o	o	o	<i>Ins.</i>	<i>Georgia—Cont'd.</i>	o	o	o	<i>Ins.</i>
Fort Morgan.....	82	25	31.0	2.35	Marietta.....	81	40	60.4	3.42
Fraser.....	82	25	31.0	3.50	Milledgeville.....	84	40	64.0	3.08
Fruita.....	82	25	31.0	0.30	Millen.....	94	34	65.2	1.57
Georgetown.....	59	13	39.2	1.84	Monticello.....	48	63.2	1.23	
Greeley.....	77	17	46.7	2.92	Point Peter.....	38	61.9	1.75	
Gunnison.....	67	10	38.8	1.70	Perry.....	46	65.0	1.24	
Hardin.....	78	28	50.8	2.43	Quitman (1).....	86	45	69.8	0.50
Hugo.....	78	28	50.8	2.61	Thomasville (1).....	88	41	68.4	0.07
Husted.....	78	15	45.8	2.07	Woolley's Ford.....	88	38	59.2	
Julesburg.....	84	20	52.8	3.07	<i>Idaho.</i>				
Kirk.....	78	29	52.4	0.50	American Falls.....	88	20	50.8	2.13
Kit Carson.....	78	29	52.4	0.50	Boise Barracks.....	88	10	37.6	0.00
Laird.....	88	20	52.0	2.14	Bonanza.....	76	12	41.3	0.02
Lamar.....	88	20	52.0	2.14	Era.....	76	12	41.3	0.02
Las Animas.....	84	21	51.7	0.85	Fort Sherman.....	82	21	46.2	0.59
Lay.....	83	8	26.8	0.24	Kootenai.....	80	22	46.4	0.85
Leadville.....	82	19	48.5	2.18	Lewiston.....	89	24	53.8	0.43
Le Roy.....	82	19	48.5	2.18	Payette.....	88	19	52.6	0.93
Livermore.....	78	17	41.7	4.56	Soda Springs.....	74	4	31.0	1.80
Magnolia.....	78	17	41.7	4.56	<i>Illinois.</i>				
Middle Box Elder.....	71	5	41.4	2.13	Aurora (1).....	78	17	47.6	2.17
Monte Vista.....	72	13	41.2	2.77	Aurora (2).....	79	20	49.8	2.83
Moraine.....	62	13	41.2	0.25	Beardstown.....	82	26	52.8	2.71
Parachute.....	75	22	46.8	2.66	Belvidere.....	82	26	52.8	2.71
Peyton.....	75	22	46.8	2.66	Centralia.....	88	28	56.0	6.65
Ranch near Como.....	54	5	32.4	1.17	Charleston.....	82	28	54.4	2.66
Red Cliff.....	83	28	46.3	2.97	Cockrell.....	80	32	52.6	2.34
River Bend.....	86	19	48.8	3.05	Collinsville.....	86	28	56.2	4.01
Rocky Ford.....	86	19	48.8	3.05	Dwight.....	83	22	51.6	3.95
Sanborn.....	68	12	42.8	3.49	East Peoria.....	88	31	56.7	2.19
San Luis Ex. Sta.....	68	12	42.8	3.49	Flora.....	86	28	56.5	5.27
Sedgwick.....	77	22	51.3	3.49	Fort Sheridan.....	75	28	45.5	4.82
Sheridan Lake.....	77	22	51.3	3.49	Galeconda.....	84	36	58.6	4.79
Springfield.....	77	22	51.3	3.49	Grand Tower.....	85	27	55.5	5.11
T. S. Ranch.....	82	13	46.8	1.50	Greenville.....	86	30	54.8	2.85
Thon.....	82	13	46.8	1.50	Griggsville.....	85	21	51.1	3.39
Sunnyside.....	72	2	37.0	3.82	Hennepin.....	88	26	56.2	5.40
Upper Pine.....	72	2	37.0	3.82	Irishtown.....	88	26	56.2	5.40
Vilas.....	72	2	37.0	3.82	Jordan's Grove.....	81	28	53.0	6.54
Villa Grove.....	72	2	37.0	3.82	Lake Forest.....	79	19	44.1	4.29
Waterville.....	86	22	49.7	4.25	Louisville.....	84	28	55.7	4.80
Watkins.....	86	22	49.7	4.25	Martinsville.....	80	32	54.8	2.46
Westcliffe.....	63	0	40.1	4.44	Mascoutah.....	92	22	56.2	8.20
Wray.....	63	0	40.1	4.44	Mattoon.....	80	30	55.4	3.65
Yuma.....	63	0	40.1	4.44	McLeansboro.....	84	30	55.4	3.65
<i>Connecticut.</i>					Mount Carmel.....	81	35	56.4	3.81
Birmingham.....	78	22	45.8	2.35	Olney.....	80	20	47.2	2.58
Canton.....	78	22	45.8	2.35	Oswego.....	80	20	47.2	2.58
Clarks Falls.....	78	22	45.8	2.35	Ottawa.....	82	19	52.0	1.87
Colchester.....	78	22	45.8	2.35	Pana.....	86	36	57.9	3.41
Falls Village.....	78	22	45.8	2.35	Peoria (1).....	84	31	55.8	2.33
Fort Trumbull.....	75	26	47.5	4.61	Peoria (2).....	83	31	55.8	3.95
Hartford (1).....	80	24	45.1	3.00	Philo.....	86	24	51.2	4.15
Hartford (2).....	80	24	45.1	3.00	Riley.....	76	20	46.0	2.88
Lake Konomoc.....	74	22	44.7	3.15	Rockford.....	76	20	46.0	2.88
Lebanon.....	74	22	44.7	3.15	Rock Island Arsenal.....	83	18	55.3	0.99
Mansfield.....	74	22	44.7	3.15	Rushville.....	86	26	54.3	2.33
Meriden.....	78	25	46.9	2.84	South Evanston.....	76	20	47.0	2.68
Middletown.....	78	25	46.9	2.84	Sycamore.....	76	15	47.0	2.58
New Hartford (1).....	70	19	38.5	2.36	Watseka.....	80	23	51.3	3.86
New Hartford (2).....	70	19	38.5	2.36	White Hall.....	84	28	58.3	2.09
North Woodstock.....	75	20	45.6	2.62	Winnebago.....	80	32	51.9	3.50
Shelton.....	75	20	45.6	2.62	<i>Indiana.</i>				
Southington.....	75	20	45.6	2.62	Angola.....	78	24	50.2	4.20
South Manchester.....	75	20	45.6	2.62	Butlerville.....	77	33	54.4	3.73
Thompson.....	72	22	45.9	4.99	Cannelton.....	81	31	54.0	2.66
Uncasville.....	72	22	45.9	4.99	Columbia City.....	76	24	51.1	4.40
Voluntown.....	77	21	46.0	2.67	Columbus.....	78	32	53.6	2.94
Wallingford.....	77	21	46.0	2.67	Connorsville.....	78	31	54.4	2.71
Waterbury.....	79	24	45.7	2.43	De Gonia Springs.....	78	35	58.4	5.08
West Simsbury.....	79	24	45.7	2.43	Evansville.....	75	20	49.2	6.46
<i>Delaware.</i>					Franklin.....	78	30	52.4	3.57
Kirkwood.....	38	51.2			Huntingburg.....	77	32	53.7	3.46
<i>District of Columbia.</i>					Huntington.....	81	31	59.4	6.27
Washington B'ks.....	84	24	42.0	2.70	Jeffersonville.....	81	33	57.5	3.56
<i>Florida.</i>					La Fayette.....	78	25	53.2	3.72
Altamonte Springs.....	90	48	71.6	0.77	Logansport (1).....	78	25	53.2	3.72
Alva.....	95	45	71.9	0.39	Logansport (2).....	78	24	51.8	5.71
Archer.....	93	42	70.6	1.33	Marengo.....	85	41	58.8	8.80
Fort Barrancas.....	84	44	69.2	1.30	Marion.....	78	28	50.9	3.11
Fort Meade.....	86	42	72.8	0.25	Mauzy.....	74	26	50.2	3.10
Homeland.....	91	49	73.4	0.35	Mount Vernon (1).....	79	32	56.1	6.70
Hypoluxo.....	91	49	73.4	0.35	Mount Vernon (2).....	79	32	56.1	6.70
Lake City.....	90	48	71.6	0.77	Muncie.....	78	24	54.0	3.67
Madison.....	86	55	69.7	0.12	New Providence.....	77	29	52.5	5.27
Manatee.....	92	52	70.9	0.57	Point Isabel.....	82	22	51.5	6.73
Matanzas.....	87	58	70.8	2.11	Princeton.....	79	30	54.7	4.35
Merritt's Island.....	90	58	73.4	0.28	Richmond.....	74	27	52.3	2.81
Ocala.....	87	62	71.4	0.76	Rockville.....	82	31	55.8	3.15
Pine Level.....	86	51	70.8	0.80	Rushville.....	82	31	55.2	3.73
St. Francis B'ks.....	86	51	70.8	0.80	Shelbyville.....	78	34	56.4	3.10
San Antonio.....	89	48	69.2	1.07	Spiceland.....	77	28	53.7	3.40
Tallahassee.....	84	48	69.2	0.85	Sunman.....	77	20	53.4	2.72
Villa City.....	90	60	71.5	0.60	Vevay.....	82	26	56.6	4.33
<i>Georgia.</i>					Vincennes.....	82	31	54.9	4.30
Athens (1).....	83	40	62.6	1.42	<i>Indian Territory.</i>				
Athens (2).....	89	36	63.8	2.46	Caddo Creek.....	94	38	64.3	
Diamond.....	84	35	59.7	8.75	Enfusa.....	94	38	64.3	7.60
Forsyth.....	84	48	66.7	1.80					
Fort McPherson.....	84	32	62.4	2.11					
Gillsville.....	80	48	64.2	1.65					
Hephzibah.....	84	50	64.9	0.13					
Jesup.....	84	50	64.9	0.13					
Louisville.....	90	39	65.7	1.93					

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
<i>Indian Ter.—Cont'd.</i>	o	o	o	<i>Ins.</i>	<i>Kansas—Cont'd.</i>	o	o	o	<i>Ins.</i>
Fort Gibson.....	86	38	62.0	7.39	Marmaton.....	84	32	57.3	2.26
Fort Reno.....	90	32	60.2	6.02	McAllister.....	90	24	53.1	5.65
Fort Sill.....	90	34	60.8	8.77	Minneapolis.....	86	28	53.9	1.56
Fort Supply.....	92	31	62.8	2.98	Monument.....	84	22	52.5	3.87
Guthrie.....	92	36	62.8	5.37	Morse.....	85	30	58.4	3.71
Healdton.....	83	36	61.7	10.39	Oakley.....	92	28	58.4	3.71
Tulsa.....	83	36	61.7	4.70	Oberlin.....	92	28	58.4	3.71
<i>Iowa.</i>					Offerle.....	91	27	54.5	4.62
Amana.....	78	24	51.2	1.50	Ogallah.....	88	27	52.1	4.00
Ames.....	80	20	53.5	2.10	Oswego.....	86	35	54.4	4.20
Atlantic.....	82k	36k	58.4k	0.43	Ottawa.....	90	29	56.6	4.20
Bancroft.....	84	12	49.5	1.94	Quenemo.....	88	30	53.1	2.24
Belle Plaine.....	80	26	48.7	1.42	Quinter.....	90	26	55.0	6.02
Blakeville.....	82	23	51.4	1.23	Richfield.....	88	34	56.3	3.34
Carroll.....	82	16	50.3	1.78	Rome.....	84	30	57.2	2.91
Carson.....	84	34	53.6	1.05	Santa Fe.....	89	31	57.2	3.10
Cedar Rapids.....	78	24	52.2	2.42	Sedan.....	89	36	59.7	3.35
Clarinda.....	86l	23	54.5	0.65	Seneca.....	94	26	57.9	0.77
Clinton.....	81	23	51.8	2.72	Sharon Springs.....	86	28	48.6	1.80
Cresco.....	78	18	47.3	1.64	Shields.....	90	28	51.1	3.98
Des Moines.....	82	24	54.2	5.15	Tribune.....	86	22	50.2	6.28
Eagle Grove.....	78	11	50.8	3.33	Wa Keeney.....	84	30	55.0	...
Elkader.....	76	26	49.3	3.53	Walker.....	92	27	58.4	6.25
Fayette.....	74	16	48.2	3.53	Wallace.....	92	32	53.2	4.60
Fort Madison.....	84	33	53.7	1.39	Weskan.....	88	30	53.0	1.61
Glenwood (1).....	88	22	50.8	0.38	Wilson.....	88	28	53.0	6.20
Grinnell.....	78	31	53.9	1.38	Yates Centre.....	90	31	56.1	2.25
Hampton.....	75	13	47.2	2.28	<i>Kentucky.</i>				
Humboldt.....	82	10	50.8	2.70	Bowling Green.....	92	33	62.4	3.56
Independence.....	76	30	50.4	2.98	Burnside.....	92	33	62.4	3.56
Iowa City.....	72	28	49.0	1.83	Callettsburgh.....	82	34	60.5	4.89
Le Claire.....	83	19	56.2	2.17	Canton.....	82	34	60.5	4.89
Logan.....	83	19	56.2	2.17	Eddyville.....	82	34	60.5	4.89
Manson.....	80	28	54.4	4.46	Falmouth (1).....	82	34	60.5	4.89
Maquoketa.....	80	31	52.3	1.70	Frankfort (1).....	82	34	60.5	4.89
McCaalsland.....	79	35	54.6	2.05	Frankfort (2).....	85	28	56.1	3.95
Monticello.....	80	20	50.9	2.09	Franklin.....	84	37	59.9	3.41
Mount Pleasant.....	80	36	52.8	1.02	Greensburgh.....	84	37	59.9	3.41
Mount Vernon.....	86	27	54.7	1.30	Louisia.....	84	37	59.9	3.41
Osage.....	33m	48.5m	1.48	1.48	Millersburgh.....	76	37	57.7	5.44
Oskaloosa (1).....	82	26	54.1	0.60	Mount Sterling.....	81	32	53.6	4.55
Sac City.....	82	15	48.8	0.25	Newport Barracks.....	82	29	54.8	2.75
Storm Lake.....	74	20	49.4	2.69	Owenton.....	72d	30d	50.9d	...
Vinton.....	80	21	50.7	2.05	Paducah.....	86	32	58.0	4.62
Washington.....	80	26	55.5	0.28	Pellville.....	86	32	58.0	4.62
Webster City.....	82	21	50.8	1.85	Princeton.....	84	37	58.4	3.80
Wesley.....	81	2	48.1	1.80	Richmond.....	82	29	57.3	4.14
West Bend.....	82	10	45.3	2.47	Shelbyville.....	84	31	56.4	3.71
<i>Kansas.</i>					South Fork.....	83	30	57.1	4.00
Abilene.....	84	24	54.5	1.50	Williamsburgh.....	83	30	57.1	4.00
Allison.....	89	27	50.1	3.34	<i>Louisiana.</i>				
Belleville.....	90	27	50.1	1.95	Abbeville.....	83	50	71.4	6.07
Bucklin.....	90	27	50.1	2.90	Alexandria.....	83	50	71.4	6.07
Buffalo Park.....	88	20	52.2	1.87	Amite City.....	85	44	68.4	9.11
Bunker Hill.....	90	28	58.0	0.95	Baton Rouge.....	81	51	69.2	0.86
Burr Oak.....	95	24	58.0	0.25	Cameron.....	89	47	72.0	8.54
Carneiro.....	85	30	58.0	0.50	Cheneyville.....	89	41	68.0	13.15
Collyer.....	90	26	53.9	6.15	Clinton.....	85	46	67.8	9.02
Concordia.....	92	25	55.5	1.80	Columbia.....	86	44	67.8	16.85
Conway.....	88	25	55.8	1.90	Convent.....	88	51	70.5	5.63
Cunningham.....	95	29	55.4	2.30	Coushatta (1).....	88	51	70.5	5.63
Dorrance.....	94	32	55.4	0.24	Crowley.....	83	44	69.0	9.93
Downs.....	94	32	55.4	0.24	Delhi.....	83	44	69.0	9.93
Elk Falls.....	85g	38g	58.3g	2.64	Donaldsonville.....	84	43	68.0	4.87
Ellis (1).....	88	25	52.0	4.77	Edgard.....	84	54	70.2	7.48
Ellis (2).....	91	24	52.0	4.77	Emilie.....	84	50	69.6	5.33
Ellsworth.....	90	35	52.0	1.50	Farmerville.....	85	44	66.0	5.88
Emporia.....	84	37h	56.7	3.84	Girard.....	84	45	64.0	8.19
Englewood.....	88	30	58.0	2.33	Grand Cane.....	82	48	70.0	10.64
Ft. Leavenworth (1).....	90	27	55.8	2.45	Grand Coteau.....	85	44	68.0	11.16
Ft. Leavenworth (2).....	84	29	55.9	2.82	Hammond.....	85	48	68.0	11.16
Fort Riley.....	90	31	56.9	2.75	Houma.....	86	45	69.8	2.11
Fremont.....	90	24	53.3	4.42	Jackson Barracks.....	85	53	69.4	3.58
Gibson.....	90	22	52.0	3.76	Jeanerette.....	84	41	69.4	11.16
Globe.....	87	32	53.8	2.57	La Fayette.....	88	41	69.8	7.70
Gorham.....	93	30	56.5	1.90	Lake Charles.....	85	55	68.2	6.20
Gove City.....	105	25	53.0	3.16	Liberty Hill.....	89	37	66.8	7.70
Grainfield.....	82	27	52.2	4.00	Luling.....	85	41	67.4	3.68
Grnola.....	91	35	57.9	2.00	Mandeville.....	87	44	70.6	5.73
Grinnell.....	90	24	52.9	3.26	Marksville.....	88	50	70.2	13.56
Halstead.....	86	29	56.1	2.69	Maurepas.....	85	45	70.0	6.73
Havensville.....	97	28	55.6	3.75	Melville.....	85	46	69.4	12.45
Hays City.....	90	30	56.2	4.00	Monroe.....	85	46	69.4	12.45
Horton.....	97	30	57.9	1.47	New Iberia.....	85	46	69.4	12.45
Hoxie.....	88	20	56.2	3.15	Paincourtville.....	85	46	69.4	12.45
Independence.....	88	35	58.0	2.41	Plaquemine.....	86	43	67.8	7.49
Junction City.....	88	35	58.0	2.41	Port Eads.....	84	56	69.8	2.67
Kanopolis.....	98	38	58.0	1.50	Shell Beach.....	84	50	69.3	12.25
Kansas City.....	89	29	55.8	3.19	Sugar Ex. Station.....	84	42	69.5	3.27
Kellogg.....	92	33	58.2	3.98	Thibodaux.....	84	42	69.5	3.27
Kingman.....	92	33	58.2	3.98	<i>Maine.</i>				
Kirwin.....	92	33	58.2	3.98	Bar Harbor.....	62	25	41.6	1.82
La Harpe.....	92	33	58.2	3.98	Belfast.....	63	32	42.3	...
Lakin.....	96	26	55.9	6.60	Calais.....	65	19	40.0	2.01
Larned.....	96	26	55.9	6.60	Cornish.....	72	21	42.6	2.26
Lawrence.....	89	29	56.6	2.51	Fairfield.....	67	21	41.0	1.71
Lebo.....	90	27	56.4	3.70	Farmington.....	67	21	41.0	1.71
Leoti.....	90	20	50.6	4.90	Fort Preble.....	67	27	38.4	1.74
Lincoln.....	90	30	55.6	...	Kennebec Arsenal.....	67	18	38.0	0.90
Lisbon.....	90	30	53.0	4.50	Kent's Hill.....	66	22	40.4	1.88
Luray.....	90	30	57.8	1.50	Lewiston.....	66	22	39.7	2.17
Macksville.....	91	25	51.6	3.50	Mayfield.....	66	17	37.0	2.42
Manhattan (1).....	91	25	51.6	3.50	Orono.....	64	22	40.2	2.02
Manhattan (2).....	93	26	56.2	1.74					
Manhattan (3).....	94	29	56.7	1.82					

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
<i>Maine—Cont'd.</i>	°	°	°	<i>Ins.</i>	<i>Michigan—Cont'd.</i>	°	°	°	<i>Ins.</i>
Petit Menan *	64	28	41.5	.....	Benton Harbor	80	23	50.2	3.99
West Jonesport	65	26	38.2	.....	Bensonia	72	12	41.2	2.23
<i>Maryland.</i>					Berlin	80	18	44.6	3.13
Barron Creek Sp'g	78	25	52.6	3.90	Berrien Springs*	76	27	47.8	3.87
Cumberland (1)	78	24	51.8	3.58	Big Rapids	76	12	44.3	2.68
Cumberland (2)	82	27	54.0	3.51	Birmingham	75	21	46.7	3.03
Fallston	80	29	51.2	3.18	Bronson	70	26	45.4	3.35
Fort McHenry	80	31	52.6	2.63	Buchanan	72	24	48.0	4.69
Frederick	85	29	54.9	3.75	Calumet	65	16	37.2	1.85
Gaithersburg*	75	31	49.6	.....	Cassopolis	76	25	48.1	4.96
Galena*	37	54.2	3.34	.....	Caldwell	74	4	40.0	3.78
Jewell	34	54.9	2.00	.....	Charlevoix	74	11	39.9	1.87
McDonough	75	28	51.9	4.14	Chase	74	7	43.9	.....
Mt. St. Mary's Coll	84	25	53.2	3.13	Cheboygan	72	6	38.1	2.25
Woodstock	80	23	52.2	3.72	Chelsea	77	16	48.5	5.55
<i>Massachusetts.</i>					Clinton	76	21	46.8	3.48
Amherst	77	22	46.6	1.67	Colon	70	25	45.6	4.30
Amherst Ex Sta (1)	78	22	45.4	1.64	Columbiaville	78	22	48.1	1.26
Amherst Ex Sta (2)	80	22	45.8	1.73	Concord	75	19	46.8	4.10
Andover	73	33	44.8	.....	Crawford	65	14	43.8	1.57
Blue Hill (sum't)	70	31	42.9	3.67	Crystal Falls	73	1	39.2	0.85
Blue Hill (base)	71	22	45.1	3.68	Detroit	77	24	48.9	2.45
Blue Hill (valley)	72	23	45.0	3.10	East Tawas	73	21	42.1	2.30
Boston	73	30	44.4	2.78	Eden	70	22	47.9	4.15
Brewster	73	30	44.4	2.19	Evart	63	2	35.9	2.54
Cambridge (1)	71	25	44.8	2.03	Fairview	75	22	44.3	3.71
Cambridge (2)	72	24	46.3	4.83	Fitchburg	75	12	44.5	2.39
Chestnut Hill	72	23	45.8	2.93	Flint	66A	24	36.2A	2.43
Chicopee	77	22	46.6	2.44	Fort Brady	58	16	37.0	1.48
Clinton	67	24	44.0	3.80	Fort Mackinac	76	23	46.4	3.22
Cotuit	80	26	46.4	2.10	Fort Wayne	74	15	42.2	3.57
Deerfield*	75	26	44.4	2.10	Fremont*	61	1	36.6	0.90
Dudley	71	23	44.0	4.23	Gadwin	70	17	43.3	1.00
Fall River (1)	78	23	45.6	4.64	Grand Rapids	79	18	45.3	3.41
Flekdale	71	26	44.0	1.88	Grape	76	31	47.4	3.32
Fitchburg (1)	73	23	45.5	2.18	Grayling	75	5	41.8	3.28
Fitchburg (2)	73	23	45.5	2.18	Gulliver Lake	59	1	37.4	1.48
Fort Warren	75	25	39.7	2.69	Hanover	74	19	46.1	3.49
Framingham	72	24	47.0	2.63	Harbor Springs	77	12	42.4	2.22
Gilbertville	76	20	45.3	3.00	Harrison	77	12	37.7	3.99
Groton (1)	76	22	46.2	2.17	Harrisville	75	12	43.7	4.70
Heath	80	18	40.5	.....	Hart	73	20	46.6	3.64
Kendall Green	76	26	47.5	2.41	Hastings	73	20	46.6	3.64
Lake Cochituate	74	19	46.3	2.51	Hayes	71	29	45.6	1.61
Lawrence	74	23	45.4	1.80	Highland Station*	75	20	44.8	3.48
Leicester	72	19	43.9	2.40	Hilldale	77	25	49.1	3.13
Leominster	72	24	46.2	4.12	Howell	70	19	44.2	3.39
Long Plain*	72	24	44.8	1.97	Hudson	80	19	48.9	1.78
Lowell (1)	71	24	44.8	1.97	Ionia	70	11	45.0	1.92
Lowell (2)	73	23	44.8	.....	Ivan	76	6	39.1	2.08
Lowell (3)	75	22	47.0	.....	Jeddo	76	21	42.9	3.40
Ludlow (1)	81	21	46.1	2.44	Kalamazoo	74	23	46.4	3.40
Ludlow (2)	75	15	43.5	2.23	Lansing	75	21	46.8	3.23
Lynn	71	25	45.0	2.59	Lathrop	88	4	38.3	1.05
Mansfield	74	22	45.4	4.10	Madison	78	22	48.5	3.38
Medford	76	21	44.4	2.98	Marshall	77	18	47.7	4.56
Middleborough	72	29	44.8	3.34	May	76	17	44.2	2.04
Milton*	77	12	44.2	2.66	Montague	69	20	42.2	2.98
Monson	77	12	44.2	2.66	Mostville	78	20	49.6	3.52
Mount Nonotuck	73	16	43.9	1.75	Noble	73	16	43.9	3.50
Mystic Lake	67	28	43.9	2.46	North Marshall	73	16	43.9	4.45
Mystic Station	67	28	43.9	2.46	Olivet	75	18	45.5	3.33
Nahant	67	28	43.9	2.46	Otsego	77	24	48.0	5.02
New Bedford (1)	65	23	44.0	4.10	Ovid	75	14	45.1	2.77
New Bedford (2)	71	23	45.8	3.65	Parkville	75	14	45.1	4.85
Newburyport (1)	75	25	44.9	1.78	Paw Paw	76	18	48.3	3.21
Newburyport (2)	72	25	47.0	2.01	Pontine	72	24	45.0	3.68
North Billerica	75	23	46.4	2.36	Pulaski	70	20	44.8	2.42
Plymouth	70	26	46.2	3.50	Rawsonville*	80	20	48.0	3.40
Princeton	69	19	44.1	2.28	Romeo*	75	20	43.0	3.39
Provincetown	69	30	44.5	3.14	Roscommon	75	9	40.8	5.35
Randolph	69	30	44.5	3.14	Saint Ignace	67	9	37.1	3.12
Roberts' Dam	74	30	48.2	2.47	Saint John's	77	18	45.4	2.62
Royalston*	74	29	45.0	.....	Sand Beach	74	20	39.8	1.86
Salem (1)	74	29	45.0	.....	Stanton	75	15	43.6	1.82
Salem (2)	81	22	47.5	3.83	Stockbridge	77	20	46.0	3.35
South Hingham	76	26	47.6	2.21	Thornville	72	24	47.8	4.73
Springfield Arm'y.	74	25	49.0	3.96	Vandala	72	24	47.8	4.73
Taunton (1)	79	24	49.1	3.92	Vienna	72	24	47.8	4.73
Taunton (2)	75	23	45.2	3.81	Washington	76	19	46.1	2.77
Wakefield	71	21	41.4	2.33	Weldon Creek	81	12	43.7	2.57
Waltham	79	20	46.7	2.86	West Branch	70	10	42.6	2.86
Wellesley	79	23	47.6	2.62	Williamston	74	30	48.5	3.45
Westborough*	73	23	44.7	1.46	Ypsilanti (1)	73	21	43.8	3.83
Williamstown	73	23	44.7	2.49	Ypsilanti (2)	76	24	46.8	3.14
Winchester	72	27	46.2	2.50	<i>Minnesota.</i>				
Worcester (1)*	72	24	46.6	.....	Alexandria	81	20	43.4	0.69
Worcester (2)	72	24	46.6	.....	Crookston	80	18	48.1	0.24
<i>Michigan.</i>					Farmington	80	18	48.1	0.24
Adrian	79	22	47.4	3.90	Fergus Falls*	80	18	48.1	0.24
Albion (1)	72	25	48.2	4.93	Fort Ripley	83	17	48.3	1.85
Allegan	75	12	44.5	2.61	Grand Meadow	79	23	42.6	1.11
Alma	75	12	44.5	2.61	L. Winnibigoshish	71	10	41.2	0.54
Amador	74	13	43.2	2.00	Leech Lake	72	4	41.3	1.20
Ann Arbor	73	22	46.5	3.90	Le Sueur*	83d	25d	49.6d	2.15
Arbela	73	22	46.5	3.90	Mankato	81	22	50.3	2.00
Atlanta*	54	20	32.7	1.40	Medford	84	15	46.4	1.76
Ball Mountain	73	18	44.0	2.97	Minneapolis*	77	21	47.5	1.75
Bangor	78	19	48.0	4.05	Montevideo	81	17	49.0	1.41
Bea Lake	70	6	37.9	2.05	Morris	78	26	48.0	0.60
Bell Branch*	66	28	42.8	4.22	Northfield	83	17	47.8	1.57
					Ortonville	80	17	47.8	0.39
					Owatonna	81	16	46.9	0.60

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
<i>Minnesota—Cont'd.</i>	°	°	°	<i>Ins.</i>	<i>Nebraska—Cont'd.</i>	°	°	°	<i>Ins.</i>
Pine River	70	10	41.7	2.31	Culbertson (2)†	88	32	48.3	5.24
Pokegama Falls	71	17	40.9	1.27	David City	82	10	42.0	1.05
Red Wing	81	18	48.8	1.87	De Soto*	87	21	54.6	2.03
Redwood Falls†	82	19	44.9	0.93	Fort Niobrara	86	7	45.9	1.00
Rolling Green	75	19	44.9	2.95	Fort Omaha	82	21	55.8	1.51
Saint Charles*	80	19	34.8	2.27	Fort Robinson	81	18	48.1	1.82
Sheldon*	80	27	47.8	1.33	Fort Sidney	80	18	48.6	2.77
Tracy†	80	27	47.8	0.82	Franklin	86	18	49.6	0.25
<i>Mississippi.</i>					Fremont*	83	19	54.5	0.92
Agricultural College	84	47	64.7	5.46	Genoa†	84	19	53.0	1.31
Batesville†	86	35	63.5	3.90	Gering	80	21	47.6	3.19
Booneville	83	40	62.8	4.35	Grand Island	72	20	48.7	1.12
Brookhaven†	80	38	65.8	5.05	Grant	80	21	47.6	3.19
Canton	82	47	66.0	5.19	Hay Springs	82	16	45.6	1.73
Columbus (1)†	84	39	63.2	6.70	Hebron	93	23	56.2	2.80
Columbus (2)	83	41	65.6	6.80	Howe	90	23	59.4	0.80
Edwards†	85	44	68.2	9.04	Kennedy†	81f	20f	48.8f	1.41
Fayette	85	44	68.2	9.04	Kimball	81	17	48.4	2.49
Greenview	81	53	66.8f	11.01	Lexington*	80	21	54.0	0.32
Hattiesburg	85	49	69.8	2.47	Lincoln	89	21	54.0	0.32
Holly Springs (1)*	80	40	62.0	6.07	Marquette (1)	92	24	56.7	0.44
Kosciusko†	85	44	64.8	0.62	Nebraska City	86	32	56.7	0.64
Lake	87	34	64.0	4.57	North Loup†	84	29	52.4	1.68
Logtown	84	46	68.9	4.88	Palmer	82	24	48.5	0.60
Louisville†	88	38	64.6	6.25	Plattsmouth†	88	16	52.4	2.76
Macon (1)	84	53	67.2	1.26	Ravenna	88	20	51.3	1.07
Moss Point	84	50	70.4	3.60	Sargent	84	20	51.3	1.67
Natchez	82	50	67.0	9.07	Syracuse*	85	27	56.2	0.93
Oklahoma†	86	46	64.2	6.21	Tecumseh	90	30	56.9	1.45
Palo Alto	84	46	68.9	4.88	Tekamah	83	16	56.8	2.16
Pearlington†	85	42	66.7	6.57	Weeping Water*	87	18	53.2	0.99
Port Gibson†	84	38	61.8	4.83	West Hill	88	28	49.1	0.31
Pontotoc	84	38	61.8	4.83	Weston	89	29	52.2	0.57
Rienzi	86	44	63.8	2.06	West Point	80	32	52.2	0.70
Summit	83f	44f	64.8f	8.15	Wilcox	94			1.65
Vaiden	88	38	66.5	7.20	<i>Nevada.</i>				
Washington	84	45	69.0	9.72	Austin	73	17	45.4	1.26
Water Valley*	88	46	66.0	4.10	Beowawe*	80	33	51.5	0.42
Waynesboro (1)†	85	37	65.9	4.55	Candelaria	73	27	49.9	0.00
Yazoo City†	85			5.65	Carson City	78	22	49.8	0.15
<i>Massouri.</i>					Columbus Marsh	82	22	50.4	T.
Appleton City	85	27	56.4	3.70	Crane's Ranch				0.70
Boonville	86	29	55.7	2.89	Downeyville	79	24	50.9	2.11
Brunswick	87	29	55.7	1.90	El Dorado	96	46	50.0	0.05
Carthage†	84	35	58.7	1.90	Elko (2)	82	10	45.4	1.14
Centerville	83	27	59.6	6.51	Ely	62	29	42.6	0.90
Conception	97	24	53.9	1.03	Eureka	77	16	46.4	1.00
Craig				0.00	Genoa	78	24	49.5	0.00
Excelsior Springs*	89	27	54.6	3.10	Gold Mountain	72	29	51.8	0.01
Fayette†	85	29	56.0	1.82	Hot Springs (2)	80	25	46.3	0.34
Frankford (1)*	80	30	48.5	1.17	Humboldt*	82	28	47.6	1.07
Glasgow	86	28	55.6	2.22	Lewers Ranch	77	23	49.4	0.28
Grand Pass	88	30*	56.2	1.19	Palmetto	74	21	46.9	0.50
Hannibal	92	28		1.88	Palisade*	80	27	47.6	1.00
Harrisonville†	86	30	51.2	1.63	Pioche				2.20
Hermann†				2.16	Reno*	75	23	49.0	0.30
Ironton*	88	32	58.0	7.00	Ruby Hill	62	8	37.2	0.60
Jefferson Barracks	90	26	57.1	4.72	Sodaville	80	27	53.4	0.00
Jerome				2.34	Verdi	69	33	42.7	0.00
Kansas City	91	29	57.0	2.73	Virginia City	73	27	50.2	0.45
Lamonte	84	30	58.0	2.40	<i>Newfoundland.</i>				
Lebanon	82	34	57.0	1.77	Saint John's	63	8	35.3	4.97
Liberty	92	27	56.1	1.77	<i>New Hampshire.</i>				
Louisiana Bridge†				1.77	Antrim				1.57
Marshfield	88	30	57.7	1.77	Belmont				1.81
Miami				2.42	Berlin Falls	72	10	36.0	1.94
New Haven*	88	30	57.2	3.85	Berlin Mills*	71	14	38.6	1.94
Oak Ridge*	83	35	57.9	0.95	Concord	75	19	43.8	1.88
Oregon	92	27	56.5	1.31	East Canterbury	68	22	41.9	1.72
Ozark*	90	32	59.2	3.20	Hanover (1)	70	10	41.5	1.57
Princeton*	90	27	55.8	2.15	Hanover (2)	76	11	41.5	1.88
Saint Charles (1)				3.00	Lake Village				2.01
Saint Charles (2)	85	27	56.3	4.23	Manchester (1)	73	23	44.8	1.83
Saint Joseph†				2.12	Mine Falls				1.60
Sedalia	86	27	56.4	2.20	Nashua*	75	23	45.0	1.42
Shelbina				2.60	Newton	74	22	43.6	1.43
Steelville	88	32	56.5	5.71	North Conway	70	16	41.7	1.85
Warrensburg*	86	30	54.5	1.51	North Sutton*		27	40.6	1.85
Warrenton*		37	56.4	4.05	Pennichuck Station				1.42
Willow Springs†	82	32	59.6	5.80	Plymouth	75	13	40.2	2.19
Wither's Mill†	86	32		2.30	Strafford	75	11	41.1	4.47
<i>Montana.</i>					Walpole	69	20	42.0	1.78
Blackfeet Agency	79	7	40.6	0.68	West Milan	74	6	38.2	1.14
Camp Poplar River	83	16	45.6	0.36	Wier's Bridge				2.28
Custer				0.14	Wolfborough				1.57
Fort Assiniboine	82	12	44.0	0.11	<i>New Jersey.</i>				
Fort Custer	80	17	45.4	0.55	Allaire	81	29	49.2	3.10
Fort Keogh	84	15	46.2	0.11	Asbury Park	75	30	49.8	3.10
Fort Logan†	77	0	45.2	0.70	Belleville				2.25
Fort Maginnis	80	15	45.6	1.30	Beverly†	84	24	50.6	2.25
Fort Missoula	80	18	45.2	0.87	Billingsport L. H.	80	30	51.1	3.39
Fort Shaw	83	16	45.3	0.06	Bridgeport*	80	3†	52.8	2.99
Galpin†				0.26	Cape May C. H.	80	24	50.7	4.58
Glendive†	89	19	49.2	0.03	Egg Harbor City	81	21	50.0	4.68
Kintyre				0.00	Freehold	80	25	48.6	2.68
Martinsdale	82	11	42.4	0.48	Gillette	80	25	51.3	2.49
Powder River†	84	15	46.2	0.51	Highland Park	81	27	51.3	2.71
Virginia City	73	15	41.9	0.26	Imlaystown*	80	27	48.6	2.45
<i>Nebraska.</i>					Junction				2.97
Alliance	82	17	49.8	1.78	Lambertville*	82	31	51.0	2.38
Ansel†	84	9	51.0	3.50	Locktown	82	24	49.6	2.89
Ashland	87	38	57.2	0.96	Madison	84	25	49.2	2.02
Bussett	86	28			Moorestown*	81	26	49.7	2.14
Creighton†	85	11	48.4	2.34	Newark (1)	80	26	49.0	2.10
Culbertson (1)				5.09	Newark (2)				2.10

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean.			Max.	Min.	Mean.	
New Jersey—Cont'd.				Ins.	N'th Carolina—Con.				Ins.
New Brunswick (1)	78	32	50.3	2.35	Lenoir	80	33	57.8	3.40
New Brunswick (2)	81	35	50.3	2.51	Mount Airy	85	29	55.4	1.91
New Brunswick (3)	83	35	51.0	2.65	Mount Holly	86	30	58.8	2.52
Newton	79	35	48.3	2.65	Mount Pleasant	78	32	57.2	2.00
Ocean City	82	33	50.3	3.60	Murphy	86	32	60.5	2.75
Princeton	79	31	53.3	2.94	New Bern	84	39	55.4	3.07
Rancocas	80	27	50.0	1.94	Oak Ridge	80	30	54.4	4.31
Readington	86	32	52.9	2.43	Soapstone Mount	85	28	58.1	2.15
South Orange	82	30	49.0	2.63	Washington	83	15	47.0	0.10
Trenton	84	28	48.1	2.83	Weldon	83	19	45.4	0.85
Union	80	30	49.4	2.23	North Dakota.	83	10	41.8	1.41
Woodbury	83	29	53.0	2.26	Davenport	79	7	42.3	1.97
New Mexico.					Fort A. Lincoln	85	15	49.0	1.33
Chama	72	11	44.4	1.66	Fort Buford	82	14	42.1	0.46
Coolidge	61	9	35.9	T.	Fort Pembina	87	15	44.7	1.36
Fort Bayard	76	24	52.8	2.18	Steele	88	22	52.3	0.72
Fort Marcy	70	10	47.8	2.04	Ohio.				
Fort Selden	90	33	63.3	0.04	Akron	74	24	48.5	3.21
Fort Stanton	78	17	51.2	0.50	Ashland	77	29	51.8	2.99
Fort Union	78	5	42.2	3.36	Athens	80	23	53.2	2.71
Fort Wingate	78	20	49.5	1.00	Bangorville	74	24	48.8	2.93
Gallinas Springs	78	25	57.4	3.43	Bellevue	75	26	46.8	6.30
Hillsborough	81	29	57.4	0.29	Bement	78	21	46.1	2.98
Los Lunas	88	38	57.5	0.63	Bucyrus	76	24	48.8	3.25
Nogal	80	20	54.8	0.63	Caledonia	74	24	49.2	3.87
Red Canon	80	20	53.2	0.76	Canton	74	24	49.2	5.70
Roswell	74	26	53.2	2.10	Carrollton	78	29	52.4	3.98
Springer					Circleville (1)				3.82
New York.					Circleville (2)				3.03
Alfred Centre	72	15	43.7	3.56	Clarksville	76	28	53.2	3.11
Angelica	75	15	42.7	3.59	Cleveland	76	26	48.2	2.89
Ardenia	76	32	49.2	2.84	College Hill	76	30	56.7	3.00
Boyd's Corners	80	31	49.5	3.03	Columbus Barracks	77	26	52.8	3.18
Brookport	78	24	47.0	2.70	Dayton	76	28	53.8	2.70
Brookfield	73	11	42.5	3.26	Demos	74	26	50.2	4.28
Canton	71	14	41.9	2.14	Ellsworth				4.00
Carmel	77	25	48.9	2.96	Elyria	78	24	46.9	4.21
Cent Park, N. Y. City	79	29	49.1	1.85	Findlay	76	20	49.3	4.60
Constableville	72	8	37.2	3.75	Forstoria	78	24	51.0	2.35
Cooperstown	70	18	42.8	2.86	Garrettsville	76	17	45.5	3.96
Daids Island	81	25	46.6	2.19	Georgetown	81	28	54.7	2.94
Eden	74	24	48.3	5.22	Gratiot	76	25	51.8	3.18
Elmira	79	22	47.2	2.65	Greenville	74	26	51.5	3.37
Factoryville	78	19	44.7	2.65	Hanging Rock	81	27	53.5	3.87
Fleming	77	19	43.8	2.45	Hassan	76	24	44.0	4.80
Fort Columbus	82	39	48.8	3.06	Hiram	75	22	46.8	3.22
Fort Hamilton	82	30	48.9	1.72	Hudson				3.14
Fort Niagara	73	27	46.4	2.34	Jacksonborough	78	28	52.6	1.95
Fort Porter	66	28	44.4	3.17	Jefferson	76	22	46.0	3.79
Fort Schuyler	79	27	47.0	2.64	Kent	71	30	46.1	3.05
Fort Wadsworth	84	28	49.9	2.77	Kenton	77	24	51.9	3.85
Geneva	84	22	45.6	2.43	Leipsic	78	26	50.6	4.46
Heas Road Station	72	21	43.8	2.56	Logan	80	24	53.0	2.99
Honeyhead Brook	76	25	45.8	1.75	Lordstown	77	18	47.3	3.05
Humphrey	78	17	45.2	4.95	Mansfield				3.83
Illion	77	24	44.9	3.80	Marietta (1)				3.37
Ithaca	78	21	46.2	3.34	Marietta (2)	81	27	54.0	3.29
Keene Valley	76	11	35.8	1.82	McConnellsville	80	24	52.6	2.53
Kendall				2.02	McConnellsville	78	24	50.4	6.83
Kingston	80	18	49.0	1.62	New Alexandria	75	23	51.8	4.51
Lyons	76	26	45.0	3.25	New Comerstown	77	23	49.2	3.43
Madison Barracks				1.52	North Lewisburgh	78	25	53.9	2.55
Malone	67	20	40.4	0.98	Oberlin	74	23	48.2	3.73
Marshall	73	17	44.0	2.76	O. S. University	75	27	52.6	3.99
Middleburgh	78	23	47.1	1.50	Orangeville	75	18	47.6	3.15
Middletown	76	26	46.7	3.62	Ottawa				5.07
New Lisbon	75	6	41.3	2.90	Pomeroy	81	29	57.8	4.79
North Hammond	70	21	43.4	1.78	Portsmouth (1)				3.53
Number Four	71	8	39.2	2.96	Portsmouth (2)	86	32	55.4	3.54
Ogdensburg	69	17	40.2	2.00	Salineville	79	25	48.2	3.15
Oxford	71	15	40.0	3.64	Shiloh	74	30	52.7	3.22
Palermo	75	23	43.2	2.00	Sidney	74	29	52.7	2.63
Palmyra	81	30	47.0	3.69	Springborough				4.81
Peekskill	78	25	46.3	3.71	Tiffin	79	23	47.5	4.81
Pendleton Centre	73	21	42.4	2.74	Upper Sandusky	76	25	50.6	3.58
Perry City	76	19	42.4	3.71	Vienna	74	19	46.6	3.78
Plattsburgh	68	22	41.8	1.72	Wapakoneta	76	26	49.9	1.68
Plattsburgh B'ks	70	22	41.6	1.46	Wauseon	78	21	48.6	5.29
Port Jervis	81	19	46.4	2.68	Waverly	82	32	56.1	2.59
Potsdam	69	24	41.3	1.88	Waynesville	72	29	60.4	2.65
Poughkeepsie	80	18	47.4	1.57	Westerville	75	26	51.1	2.78
Quaker Street	75	20	43.8	1.50	West Milton	78	28	55.3	2.60
Queensbury	79	14	42.2	2.19	Weymouth	78	20	46.8	4.13
Rome	72	18	43.2	4.03	Wooster	74	23	48.4	3.10
S. E. Reservoir				3.72	Yellow Springs	73	20	52.0	2.82
Setauket	73	30	47.3	3.40	Youngstown	76	20	50.4	3.52
Sherman	72	5	43.7	4.05	Zanesville				3.19
South Canisteo	76	14	42.8	4.22	Albany	82	32	49.8	1.77
South Kortright	76	17	43.4	1.86	Ashland (2)	68	35	48.5	1.91
Turin	74	13	39.3	1.82	Bandon	80	18	47.5	2.81
Utica	78	22	44.0	3.56	Burns	83	28	50.6	1.82
Watervleit Arsenal	80	23	47.3	1.40	Cascade Locks	88	30	52.0	2.02
Wedgewood	83	22	45.1	3.90	Corvallis	87	28	47.7	0.48
West Point	78	24	48.8	2.48	Creswell				51.4
White Plains	73	29	47.2	5.60	Dufur				
Willets Point					East Portland				

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean.			Max.	Min.	Mean.	
<i>Oregon—Cont'd.</i>	°	°	°	<i>Ins.</i>	<i>Pennsylvania—Con.</i>	°	°	°	<i>Ins.</i>
Ellensburg	63	34	48.5	2.98	South Eaton	80	19	44.6	1.81
Eola	79	25	49.0	1.00	State College	76	23	48.4	3.75
Forest Grove	81	24	50.8	1.67	Swarthmore	80	24	50.5	2.88
Gardiner	71	31	49.3	2.67	Tipton	78	26	48.3	5.14
Grant's Pass	87	23	52.8	1.23	Troy	82	22	45.6	2.25
Grass Valley	80	20	44.7	0.34	Tuscarora	82	28	52.9	3.59
Heppner	84	25	51.4	0.39	Uniontown	79	28	52.1	3.90
Hood River	87	28	53.2	0.93	Warren				5.09
Jacksonville	80	26	51.6	0.82	Waynesburg			50.8	2.90
Jordan Valley	82	14	46.1	0.37	Wellsborough	82	20	44.7	4.03
Joseph	76	16	44.0	1.95	West Chester	80	25	50.1	3.15
LaGrande	85	19	50.0	0.41	Wilkes Barre	83	22	49.8	2.62
Lone Rock	77	20	46.8	0.49	Wysox	80	15	44.9	3.42
McMinnville	81	25	49.0	1.92	York	82	23	50.1	1.94
Mount Angel	83	28	53.6	1.35	<i>Rhode Island.</i>				
North Powder	80	15	46.1	0.11	Bristol	62	25	45.1	3.54
Pendleton	89	21	52.2	0.17	Fort Adams	70	24	46.3	3.58
Saint Helens	78	29	50.8	1.60	Kingston (1)	70	24	45.0	4.72
Silver Lake	86	10	46.6	0.34	Kingston (2)	75	22	45.2	4.28
Telecast				0.44	Lonsdale				4.02
Toledo	81	23	50.2	2.87	Newport	67	28	47.7	4.00
Vernonia	79	22	47.2	2.78	Olneyville	72	26	47.4	3.81
Weston	85	25	52.2	0.35	Pawtucket				3.81
<i>Pennsylvania.</i>					Providence (1)	70	26	47.5	3.59
Allegheny Arsenal	81	24	52.4	4.94	Providence (2)	70	23	46.6	3.60
Altoona	77	28	52.7	5.29	<i>South Carolina.</i>				
Annapolis	82	31	53.7	3.98	Belmont	85	35	62.8	2.23
Aqueduct	82	28	50.8	3.98	Camden	77	39	58.9	1.74
Bethlehem	83	26	52.5	2.57	Cheraw	88	36	63.2	2.09
Blooming Grove	80	25	46.8	3.10	Columbia Ex. Sta.	86	40	63.8	2.19
Blue Knob	78	18	46.4	5.50	Conway	86	42	60.2	1.21
Brookville				2.90	Florence				2.79
Cannonsburgh	80	23	51.2	4.24	Greenville				2.60
Carlisle	82	24	51.1	3.19	Hardeeville	91	36	66.9	1.60
Catawissa	77	25	49.0	2.92	Jacksonborough				1.74
Centre Valley	84	30	51.6	3.17	Kirkwood		39	58.5	1.74
Chambersburgh	82	24	50.3	1.55	Port Royal	88	48	65.6	3.44
Charlestown	79	12	44.6	2.74	Simpsonville	90	33	64.2	1.54
Clarion (1)				4.78	Spartanburgh (1)	86	31	61.3	2.60
Clarion (2)	74	18	48.4		Spartanburgh (2)	80	42	59.6	1.82
Cotatesville	81	22	49.5	2.39	Statesburgh	86	41	62.7	2.73
Columbus	76	12	45.2	4.65	Timmonsville	82	43	66.7	2.40
Confluence				4.75	Trial	89	35	61.0	1.76
Coopersburgh	83	24	50.0	3.21	Walhalla	81	40	61.6	3.45
Corry	76	12	45.2	4.65	Winnabow	90	37	63.1	1.10
Drifton	76	21	44.6	3.25	Yorkville	87	33	63.0	1.87
Doylstown				2.51	<i>South Dakota.</i>				
Dyberry	79	16	43.4	2.53	Aberdeen	89	10	41.0	0.28
Eagle's Mere	74	20	43.6	4.23	Alexandria	83	20	50.4	1.54
Easton		31		3.42	Brookings	84	10	47.9	0.79
Edinborough	68	16	43.8		Canton	84	13	51.2	2.12
Emporium	81	18	51.3	3.98	Clark	85	14	51.5	0.45
Forks of Nesquehany			50.3	2.91	De Smet		27	45.8	1.43
Franklin	74	20	45.6	4.07	Etta Mine	69	14	41.1	1.41
Franklin Arsenal	81	25	51.9	2.20	Flandreau		10		1.08
Frederick				2.26	Fort Bennett	89	12	53.3	0.76
Freeport				5.76	Fort Meade	81	6	47.0	1.03
Germantown				2.15	Fort Randall	84	20	51.0	2.35
Gettysburgh	83	21	48.7	3.31	Fort Sully	90	19	54.0	0.58
Girardville	77	22	48.5	4.40	Highmore	87	13	49.6	1.45
Grampian Hills	76	14	46.8	3.39	Kimball	82	16	47.6	1.49
Greensborough				3.75	Milbank	60	22	40.0	0.37
Greenville	76	20	44.6	4.57	Onida	84	19	46.0	0.10
Holidaysburgh	80	20	49.5	4.90	Oelrichs	78	11	45.5	1.47
Honesdale	77	19	45.4	2.87	Parkton	82	18	49.5	1.73
Huntingdon	81	20	46.2	4.91	Seranton	87	30	50.1	0.54
Indiana	75	18	53.1	4.66	Spearfish	76	20	48.3	1.47
Johnstown	75	23	49.7	4.66	Vermillion	80	13	50.2	1.11
Kennett Square	74	30	42.5	2.73	Webster	80	11	49.8	0.24
Lancaster	79	19	50.9	2.93	Wolsey	82	13	48.6	0.40
Lansdale				2.12	Woonsocket	84	16	48.8	0.87
Le Roy	78	20	45.6	3.26	<i>Tennessee.</i>				
Lewisburgh	84	22	50.8	3.54	Andersonville	78	31	58.4	3.68
Lewistown	85	23	52.1	3.66	Arlington				3.74
Ligonier	87	19	51.0	3.58	Ashwood	80	39	60.2	3.52
Lock Haven	84	20	48.6	4.22	Austin	82	34	61.8	4.39
Lock No. 4				3.25	Carthage				5.08
Lynnport	85	30	48.7	1.75	Charleston				4.15
Mahoning				2.83	Clarksville	82	35	60.0	3.58
Mauch Chunk	82	20	47.7	3.45	Clinton				3.79
McConnellsburgh	82	22	51.0	3.38	Cog Hill	83	42	62.5	3.00
Meadville (2)	73	17	44.7	4.43	Columbia				4.05
Mechoppen			44.6	1.23	Covington	79	40	62.2	7.47
Myersstown	82	22	48.4	3.39	Cumberland Gap	76	32	57.5	5.54
New Bloomfield	82	20	48.6	3.47	Dyersburg	81	37	61.3	3.94
New Castle	78	21	53.1	3.82	Fayetteville	84	42	62.0	3.34
Nisbet		39	47.5	4.00	Flarence Station	76	40	60.2	3.37
Oil City				1.32	Greenville	78	31	57.1	3.56
Ottaville				2.41	Grief	82	36	58.0	1.94
Parker's Landing				4.55	Hohenwald	85	36	58.5	4.03
Petersburgh	81	20	47.8	4.11	Jacksborough	79	31	59.1	4.09
Phillipsburgh	78	18	46.4	3.97	Johnsonville				3.51
Pleasant Mount		20	46.0	2.70	Kingston (1)				4.17
Point Pleasant				1.84	Kingston Springs	82	35	63.0	4.11
Pottstown	83	28	51.7	1.97	Lawrenceburg	78	37	58.1	3.02
Quakertown	82	22	48.4	3.22	Lewisburgh	79	39	60.8	4.03
Reading	82	19	50.3	3.62	Lynnville	80	32	57.2	2.73
Richmond	76	16	48.2		Marysville	88	35	61.9	
Salem Corners	73	22	45.1	2.98	McKenzie	83	40	62.8	4.47
Saltsburgh				4.50	Milan (1)	83	37	60.4	5.34
Seranton	76	22	47.9	2.85	Nunnely	81	34	60.1	4.56
Shillbottleville				3.23	Parkville	80	34	60.8	3.90
Shiloh's Grove	82	25	51.8	4.11	Riddleton	80	34	59.8	5.02
Smith's Corners				2.46	Rockwood				3.40
Somersett	76	21	47.0	3.16	Rogersville	79	36	57.2	4.10

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
<i>Tennessee—Cont'd.</i>	0	0	0	<i>Ins.</i>	<i>Virginia.</i>	0	0	0	<i>Ins.</i>
Rugby	79	36	57.3	5.23	Abingdon	88	24	54.9	5.46
Savannah	80	38	59.2	4.14	Alexandria	83	24	54.9	3.24
Sharp's	82	42	62.2	4.25	Birdsneat	72	22	46.6	4.50
Springdale	82	32	59.5	4.34	Bolar	72	22	46.6	1.08
Strawberry Plains	82	32	59.5	4.34	Christiansburg	84	20	55.0	1.89
Trenton	78	31	59.6	4.48	Dale Enterprise	83	24	55.0	2.34
Watkins	85	37	61.0	3.37	Fall Creek Depot	87	37	61.5	2.65
Waynesborough	86	38	59.6	5.10	Fort Monroe	82	38	58.0	4.28
Woodstock	83	41	62.6	3.25	Fort Myer	83	26	53.6	2.85
<i>Texas.</i>					Lexington	83	24	54.6	1.82
Austin (1)	89	41	68.2	5.49	Liberty	81	31	53.5	1.59
Austin (2)	87	45	67.5	5.97	Marion	78	30	54.2	3.98
Brady	91	34	63.0	5.97	Mossingford	75	20	54.4	2.02
Brazoria	85	41	68.9	7.64	Nottaway C. H.	87	25	56.1	2.41
Brenham	87	35	69.7	7.67	Petersburg	84	28	56.5	2.94
Brownwood	90	30	65.2	8.61	Richmond	88	28	57.6	2.85
Caddo Peak	87	38	62.4	8.05	Salem	80	35	55.4	2.11
Camp Del Rio	101	19	62.0	2.70	Smithfield	87	34	57.8	3.32
Camp Eagle Pass	95	39	72.0	4.45	Spottsville	84	26	56.1	1.95
C'p Peña Colorado	90	24	64.2	0.70	Staunton	80	24	53.4	1.70
Childress	95	37	62.7	6.78	Summit	80	21	51.7	0.95
College Station	87	45	68.6	5.55	University of Va.	80	21	51.7	0.95
Colorado	94	34	65.9	10.21	Woodstock	80	21	51.7	0.95
Columbia Station	85	43	69.8	5.80	<i>Washington.</i>				
Corsicana (1)	85	38	65.5	9.79	Blakeley	76	25	48.6	1.54
Dallas (1)	86	40	65.8	7.25	Doe Bay	65	32	46.6	0.96
Decatur	88	36	61.6	9.62	Fort Canby	70	34	48.1	4.18
Duval	88	44	61.7	5.85	Fort Simcoe	83	38	56.5	0.19
Edinburgh	81	30	60.3	5.37	Fort Townsend	91	20	50.3	0.20
Epworth	81	30	60.3	5.37	Fort Walla Walla	89	27	54.2	0.28
Forestburg	81	42	61.8	11.12	Vancouver B'ks	95	30	52.4	1.16
Fort Bliss	90	33	64.5	0.06	Waterville	81	21	47.4	0.70
Fort Brown	86	40	66.0	3.80	<i>West Indies.</i>				
Fort Clark	98	42	69.3	2.75	Grand Turk Island	83	80	81.3	0.44
Fort Davis	87	30	70.9	1.20	Hamilton, Bermuda	74	56	64.8	3.01
Fort Elliott	90	28	57.6	3.81	<i>West Virginia.</i>				
Fort Hancock	95	27	63.3	3.06	Buckhannon	81	25	51.1	5.10
Fort McIntosh	94	40	71.7	1.25	Charleston	81	25	51.1	5.10
Fort Ringgold	101	39	74.4	4.00	Ella	81	25	51.1	5.10
Fredericksburg	86	38	62.6	4.00	Glenville	72	25	51.1	3.56
Gainesville	88	41	64.5	13.60	Harper's Ferry	86	24	56.4	4.06
Gallatin	92	33	66.8	4.76	Hinton	80	25	45.4	3.78
Graham	94	30	62.8	10.16	Kingwood	80	25	45.4	3.78
Haskell	95	35	66.0	10.16	Morgantown	80	25	45.4	3.78
Hartley	85	10	52.4	7.57	Mount Alto	80	25	45.4	3.78
Hearne	82	44	64.3	10.59	Oceana	82	31	55.2	3.55
Houston	90	41	71.1	10.34	Pleasant Hill	74	26	51.2	5.05
Howe	89	40	67.5	8.32	Point Pleasant	74	26	51.2	5.05
Huntsville	85	42	67.5	6.30	Rowlesburg (1)	74	26	51.2	5.05
La Grange	91	30	65.4	5.40	Seven Pines	78	32	51.1	5.29
Lampasas	91	37	65.4	5.40	Tannery	78	32	51.1	5.29
Longview	87	41	67.3	5.30	Tyler Creek	80	32	54.7	5.29
Luling	86	48	69.3	5.30	Weston	80	32	54.7	5.29
Menardville	91	40	67.7	4.17	Wheeling	80	32	54.7	5.29
Merkel	86	35	60.2	6.29	White Sulph' Sp'gs.	80	32	54.7	5.29
Mesquite	86	40	64.9	8.65	<i>Wisconsin.</i>				
Miami	86	40	64.9	8.65	Butternut	10	37.4	1.58	1.58
Mountain Spring	82	32	62.8	10.22	Cadiz	30	47.0	3.16	3.16
New Braunfels	87	46	68.1	6.37	Chippewa Falls	75	14	45.8	3.70
New Ulm	89	46	68.1	6.37	Embarrass	75	14	45.8	3.70
Ochiltree	75	26	53.2	3.25	Fond du Lac	71	24	44.8	3.20
Panhandle	90	22	56.9	4.52	Glasgow	70	31	47.4	3.71
Panther	89	35	60.6	9.25	Greenwood	78	31	44.7	2.71
Pike	80	36	63.4	12.15	Honey Creek	59	35	46.0	2.09
Round Rock	86	44	68.5	2.93	Lincoln	34	42.6	4.88	4.88
San Antonio	88	42	67.4	2.62	Madison	72	25	47.0	2.22
Santa Maria	89	30	60.2	4.34	Manitowoc	76	19	44.3	3.26
Silver Falls	89	40	65.9	4.20	Medford	80	8	43.3	1.70
Tyler	86	40	63.7	9.85	Neillville	80	8	43.3	1.70
Waco (2)	86	40	63.7	9.85	Oshkosh	74	22	43.8	3.56
<i>Utah.</i>					Phillips	74	22	43.8	3.56
Beaver	84	31	49.5	0.60	Portage	76	4	41.5	1.75
Fort Douglas	78	29	51.0	0.94	Summit Lake	76	4	41.5	1.75
Fort DuChesne	70	20	49.4	0.21	Waukegan	17	40.5	T.	T.
Levan	76	34	46.6	0.25	Waukegan	30	50.4	T.	T.
Loose	76	30	46.5	0.40	Weston	23	41.2	0.80	0.80
Mount Carmel	76	26	41.2	0.73	<i>Wyoming.</i>				
Mount Pleasant	56	19	36.5	0.00	Camp Pilot Butte	75	15	42.6	0.78
Nephi	76	11	48.3	0.67	Camp Sheridan	77	5	39.0	1.39
Ogden (2)	80	34	54.5	1.69	Carbon	74	18	41.1	2.01
Park City	79	22	50.0	1.51	Carter	74	18	41.1	2.01
Richfield	79	22	50.0	1.51	Port Bridger	75	12	40.8	0.78
Snowville	78	26	46.2	1.66	Port D. A. Russell	80	8	46.2	8.07
<i>Vermont.</i>					Port McKinney	76	10	45.6	0.65
Brattleborough (1)	78	21	45.2	1.47	Port Washakie	74	6	45.4	0.53
Brattleborough (2)	78	23	46.7	1.93	Lander	73	18	45.0	0.47
Burlington	78	24	46.7	1.93	Saratoga	69	20	41.9	0.67
Chelsea	68	18	39.7	2.68	Wheatland	69	20	41.9	0.67
Cornwall	74	9	38.7	1.51	<i>Mexico.</i>				
East Berkshire	75	16	42.2	2.10	La Logia	90	45	69.6	T.
Hartland	75	16	42.2	2.10	Leon de Aldemas	88	50	69.8	0.04
Jacksonville	77	16	40.8	1.79	Mazatlan	81	65	73.4	0.00
Lunenburg	70	20	40.8	2.02	Mexico	82	48	64.2	0.50
Stratford	68	14	41.5	2.10	Topolobampo	81	63	73.6	0.00
Vernon	74	26	47.6	1.91	Zacatecas	84	40	62.8	0.00
Weathersfield C'tre	71	19	42.0	.....				

Letters of the alphabet denote the number of days missing from the record, thus: the letter c indicates three days missing in a thirty-one day month, etc., etc.

*Extremes of temperature from observed readings. †Signal Service instruments.

‡One observation daily at 10.00 a. m.

Corrections: Paducah, Ky., for total precipitation, March, 1890, 4.73 inches, read 5.23 inches; Show Low, Ariz., for total precipitation, 4.50 inches, read 0.45 inch.

Reports received too late for publication in March, 1890.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
<i>Arizona.</i>					<i>Iowa—Cont'd.</i>				
American Flag	.....	.....	.....	1.80	Muscatine	60	—15	29.9	3.29
Calabasas	.....	.....	.....	0.00	Osage	.....	.....	.....	1.52
Chloride	.....	.....	.....	0.68	<i>Maine.</i>				
Dudleyville	.....	.....	.....	0.52	Kent's Hill	.....	.....	.....	3.38
Oro	.....	.....	.....	0.48	<i>Nebraska.</i>				
Payson	.....	.....	.....	2.00	Lincoln	66	—6	32.3	0.72
Red Rock	.....	.....	.....	0.50	<i>North Carolina.</i>				
Saint Johns	.....	.....	.....	0.43	Raleigh	79	22	50.0	3.41
Silver King	.....	.....	.....	0.64	<i>South Dakota.</i>				
Simmons	.....	.....	.....	0.23	Brookings	54	—28	20.1	0.56
Stanton	.....	.....	.....	1.43	<i>Texas.</i>				
Tempe	.....	.....	.....	0.44	Colorado	94	15	58.1	0.30
Woodruff	.....	.....	.....	1.60	Corsicana (2)	80	43	65.1	1.50
<i>California.</i>					Hearne	80	20	58.5	1.88
Placerville (2)	68	26	43.2	12.94	Panther	98	21	58.5	1.36
<i>Florida.</i>					<i>Sandwich Islands.</i>				
Ocala	87	30	61.1	1.21	Honolulu	80	61	70.6	10.59
<i>Georgia.</i>					<i>Colony Surinam, S.A.</i>				
Thomasville	82	22	57.8	5.54	Burnside Coronee	87	72	78.3	9.99
<i>Kona.</i>					<i>Mexico.</i>				
Carson	62	0	30.0	1.70	Guanajuato	84	32	63.1	T.

Mean temperature (degrees Fahr.) observed at Fort Stanton, N. Mex., by assistant surgeons, U. S. Army, and Signal Service observers.

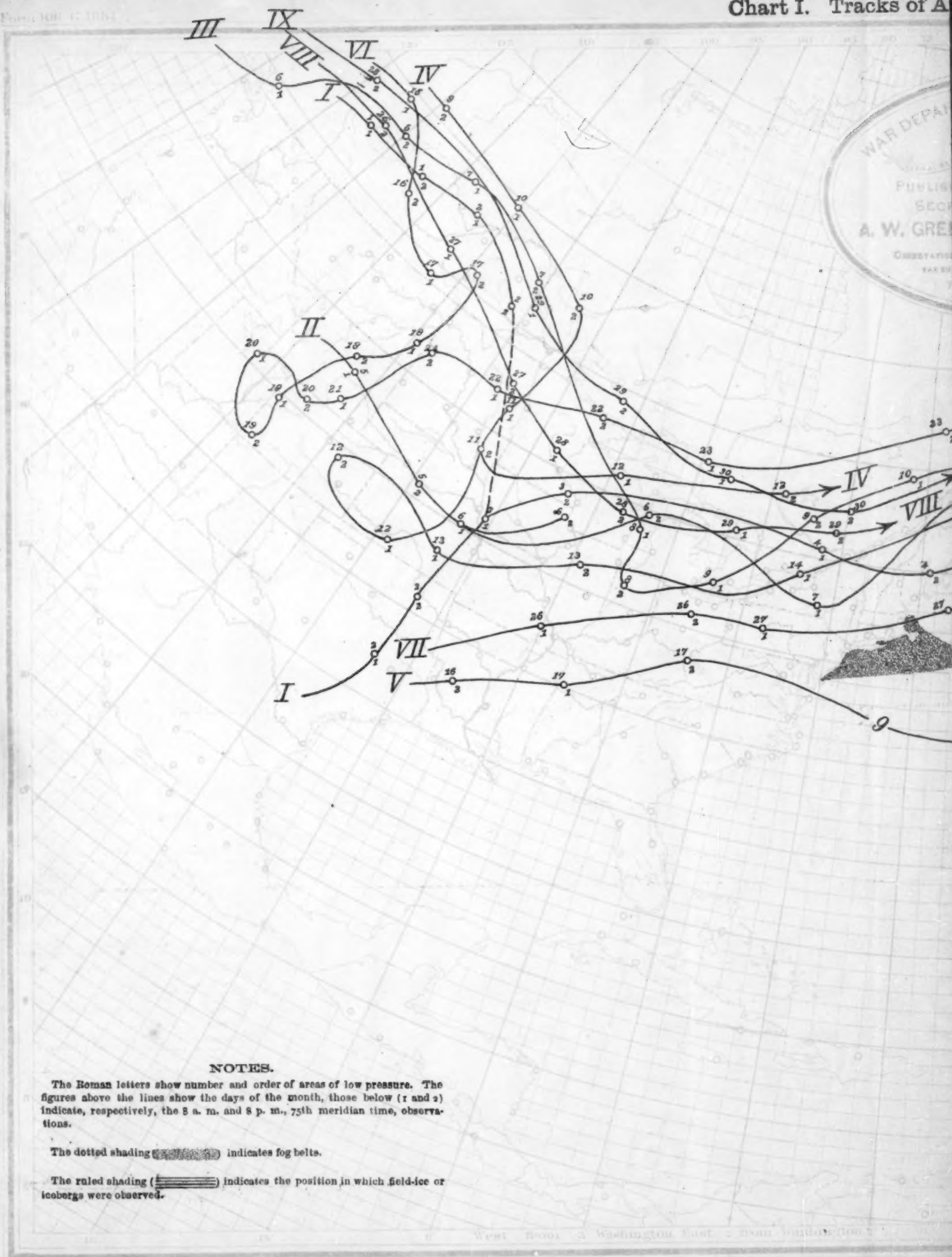
Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
1855	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1856	28.7	36.5	44.1	57.8	61.7	75.1	73.5	70.9	67.6	57.5	37.9	.....	.....
1857	34.9	34.4	47.3	47.2	57.4	64.3	69.0	67.8	56.0	56.3	37.2	31.3	49.3
1858	31.2	35.9	40.2	50.4	56.0	62.4	63.8	60.1	56.6	47.8	33.9	31.2	47.4
1859	34.3	33.9	44.7	49.0	64.1	71.2	69.5	70.2	61.0	51.0	44.9	29.7	52.8
1860	36.9	34.9	47.2	52.5	63.5	70.9	71.8	68.5	63.2	54.8	41.6	41.1	53.9
1861	33.2	42.0	47.1	53.4	61.9	67.1	66.7	.....	.....	.....	.....	.....	.....
1862	.....	.....	.....	.....	.....	.....	.....	74.9	.....	.....	.....	.....	.....
1863	41.6	37.6	42.2	52.9	61.8	71.2	.....	69.4	63.2	53.1	43.3	46.6	.....
1864	34.4	40.2	44.8	53.7	59.8	69.2	68.8	65.9	61.5	53.3	42.2	36.0	52.5
1865	33.3	35.5	44.9	49.3	60.8	65.9	71.2	67.9	63.3	50.5	48.0	33.0	52.0
1866	37.6	40.7	42.8	55.4	63.5	66.6	68.6	65.9	61.5	51.8	46.2	37.2	53.2

Table of miscellaneous meteorological data for April, 1890—Signal Service observations.

Stations and districts.	Elevation above level, feet.	Pressure, in inches.			Temperature of air, in degrees Fahrenheit.								Precipitation, in inches.		Departure from normal precipitation.	Total movement, miles.	Wind.			Cloudless days.	Partly cloudy days.	Cloudy days.	Days with rainfall.	Average cloudiness, tenths.		Precipitation data since opening of station.						
		Mean actual.	Mean reduced.	Monthly range.	Monthly mean.	Departure from normal.	Maximum.	Mean maximum.	Minimum.	Mean minimum.	Greatest daily range.	Least daily range.	Mean temperature of the dew-point.	Mean relative humidity, per cent.			Precipitation, in inches.	Departure from normal precipitation.	Prevailing direction.					Maximum velocity.		Length of record, years.	Greatest for month.	Year.	Least for month.	Year.		
																								Miles per hour.	Direction.						Date.	8 a. m.	8 p. m.
New England.																																
Eastport	53	29.94	30.00	0.04	44.5	+0.7	64	45.7	24	32.6	24	3	25.8	64.8	1.95	1.53	7.374	sw.	35	e.	27	12	11	7	10.5	5.3	6	18	6.83	1884	1.14	1886
Portland	99	29.93	30.04	1.05	42.1	-1.9	70	49.7	24	34.5	27	4	27.8	61.2	2.51	0.59	6.629	nw.	36	nw.	15	12	13	5	9.3	7.4	4	20	6.12	1884	1.33	1883
Manchester	247	29.81	30.07	1.05	44.4	0.0	74	55.6	24	33.1	40	5	27.0	54.8	1.76	0.00	4.969	nw.	30	nw.	5	17	8	5	10.3	1.4	0	4	2.60	1888	1.76	1890
Northfield	872	29.12	30.08	1.02	39.1	0.0	71	50.0	17	28.2	41	4	28.0	64.8	1.94	0.00	7.988	s.	48	n.	15	7	13	7	14.5	2.4	2	4	3.37	1887	1.10	1889
Boston	125	29.95	30.09	1.03	46.3	+1.3	72	54.3	26	38.3	30	3	32.2	63.0	2.93	0.82	8.887	nw.	40	nw.	15	13	10	7	12.4	2.3	2	4	7.97	1874	1.31	1872
Nantucket	14	30.08	30.09	1.06	43.6	0.0	58	48.7	30	38.0	18	2	37.0	77.2	1.17	0.00	8.713	ne.	38	n.	5	12	9	9	10.4	8.3	7	4	6.23	1887	1.17	1890
Wood's Holl	22	30.07	30.09	1.05	43.6	0.0	58	49.3	28	38.0	18	4	38.2	84.0	2.78	1.60	10.742	sw.	48	sw.	17	14	6	10	11.5	0.3	5	13	9.32	1874	1.69	1888
Vineyard Haven	26	30.07	30.10	1.03	44.4	+0.6	63	49.9	28	39.2	17	4	37.2	78.4	3.37	0.23	11.350	sw.	48	ne.	25	17	8	5	9.4	1.2	7	10	4.06	1887	0.91	1888
Block Island	22	30.07	30.11	1.03	45.2	+1.2	71	55.4	27	35.0	33	6	36.2	71.6	2.89	0.91	4.930	nw.	34	nw.	5	15	6	9	9.5	2.3	5	18	4.01	1887	2.56	1888
Narragansett Pier	107	29.99	30.11	1.13	47.2	+1.2	70	56.0	24	37.9	30	6	34.6	64.2	4.66	1.11	5.447	nw.	27	nw.	5	11	11	8	12.4	5.3	8	20	7.89	1874	1.55	1882
New London	47	30.03	30.08	1.05	45.0	+1.2	70	54.8	28	39.7	28	6	34.6	64.2	4.66	1.11	5.447	nw.	27	nw.	5	11	11	8	12.4	5.3	8	20	10.85	1874	1.63	1875
Mid. Atlantic States.																																
Albany	85	30.01	30.10	1.21	47.3	+0.3	79	58.2	23	36.4	39	7	35.9	71.1	1.64	0.15	6.381	s.	36	nw.	4	3	20	7	10.5	4.4	6	17	4.97	1874	1.25	1889
New York City	185	29.91	30.11	1.17	51.0	+3.0	81	60.0	30	42.0	37	6	35.6	62.7	2.58	0.73	7.931	nw.	32	nw.	15	11	11	8	13.4	9.4	7	17	7.02	1874	1.00	1881
Harrisburg	377	29.72	30.14	1.11	50.8	0.0	81	60.8	28	40.8	37	3	37.4	61.5	2.46	0.00	5.354	s.	36	nw.	5	12	12	6	9.5	1.3	9	2	3.96	1889	2.46	1890
Philadelphia	117	30.01	30.13	1.18	52.0	+1.0	81	61.4	30	42.7	39	5	36.1	60.8	2.28	0.43	7.536	nw.	42	nw.	5	10	11	9	10.4	9.4	1	19	9.76	1874	0.61	1881
Atlantic City	53	30.07	30.12	1.16	47.7	+0.7	80	54.2	29	41.2	39	4	39.7	74.8	3.86	0.56	7.997	sw.	42	nw.	7	17	7	6	11.3	8.2	1	17	6.05	1875	1.68	1885
Baltimore	76	30.04	30.13	1.12	54.0	+1.0	83	63.4	31	44.5	33	2	39.6	62.4	3.94	1.01	3.997	ne.	30	sw.	7	16	8	6	13.2	3.4	2	4	8.70	1889	1.37	1871
Washington City	112	30.02	30.14	1.14	53.6	+0.6	82	64.4	25	42.7	42	4	40.0	63.6	2.81	0.04	5.217	s.	36	nw.	7	13	10	7	11.4	3.2	9	20	9.13	1889	1.54	1871
Cape Henry	685	29.40	30.15	1.15	57.2	+1.2	85	69.1	28	45.2	41	4	40.0	58.3	3.98	1.39	3.623	s.	28	nw.	27	12	10	8	13.5	7.4	1	19	8.33	1874	1.39	1885
Lynchburg	685	29.40	30.15	1.15	57.2	+1.2	85	69.1	28	45.2	41	4	40.0	58.3	3.98	1.39	3.623	s.	28	nw.	27	12	10	8	13.5	7.4	1	19	8.33	1874	1.39	1885
Norfolk	43	30.10	30.14	1.02	57.4	+0.2	84	67.0	38	47.8	38	4	44.2	66.8	3.70	0.03	7.167	ne.	48	e.	9	12	10	8	15.5	4.4	8	20	11.87	1889	0.97	1888
S. Atlantic States.																																
Charlotte	808	29.31	30.16	0.88	60.6	+0.6	86	71.3	36	50.0	32	4	45.8	64.7	2.34	1.61	4.605	s.	25	w.	9	18	6	6	10.4	1.4	0	12	6.05	1883	1.84	1887
Hatteras	11	30.15	30.17	0.90	58.0	+1.0	74	63.7	44	52.4	20	6	52.3	82.2	4.28	0.53	11.904	sw.	44	nw.	11	14	10	6	10.4	5.3	5	16	11.07	1877	0.77	1888
Raleigh	388	29.74	30.16	0.96	59.6	+0.4	86	70.6	31	48.5	34	3	44.2	63.5	1.96	0.00	5.451	sw.	27	w.	9	10	13	7	10.5	4.4	3	4	4.01	1889	1.71	1888
Southport	52	30.11	30.17	0.87	61.0	+1.0	86	69.5	38	52.5	29	5	51.8	76.8	2.73	0.52	5.934	sw.	28	sw.	9	13	10	7	7.4	5.3	3	15	5.45	1883	1.41	1888
Wilmington	52	30.12	30.17	0.74	64.8	+0.8	88	72.3	47	57.3	26	6	57.1	81.8	2.58	1.65	5.386	sw.	30	e.	19	11	9	10	7.4	2.4	2	20	15.00	1877	1.17	1885
Charleston	52	30.12	30.17	0.74	63.8	+0.8	86	74.6	40	53.1	32	5	51.0	67.4	2.33	1.59	2.983	ne.	25	w.	9	14	8	8	8.4	3.4	9	20	6.29	1883	0.87	1888
Columbia	183	29.99	30.18	0.74	65.0	+1.0	89	76.0	39	54.1	36	4	54.3	72.6	1.09	2.96	6.008	s.	28	ne.	20	15	7	8	3.4	3.3	20	20	8.82	1877	0.71	1888
Augusta	87	30.08	30.18	0.72	66.5	+0.5	88	75.1	46	59.9	27	9	57.2	71.0	0.95	2.25	6.143	ne.	29	sw.	4	15	11	4	8.3	3.1	9	19	7.89	1876	0.56	1873
Savannah	43	30.12	30.17	0.58	69.8	-0.2	88	79.1	47	60.4	27	4	57.2	71.0	0.95	2.25	6.143	ne.	29	sw.	4	15	11	4	8.3	3.1	9	19	7.89	1876	0.56	1873
Jacksonville	43	30.12	30.17	0.58	69.8	-0.2	88	79.1	47	60.4	27	4	57.2	71.0	0.95	2.25	6.143	ne.	29	sw.	4	15	11	4	8.3	3.1	9	19	7.89	1876	0.56	1873
Florida Peninsula.																																
Jupiter	28	30.14	30.17	0.42	73.2	0.0	86	79.9	54	66.6	23	5	63.2	71.9	1.13	0.00	7.604	e.	36	e.	20	7	15	8	7.3	3.3	9	3	4.08	1888	1.13	1890
Key West	22	30.13	30.15	0.31	75.2	-1.8	83	79.6	66	70.9	12	6	65.2	72.4	1.11	0.22	8.021	e.	32	e.	20	16	10	4	7.4	2.1	7	20	4.99	1881	0.02	1871
Micco	36	30.13	30.15	0.46	72.0	0.0	90	83.4	52	60.7	33	11	60.9	72.7	0.55	0.00	4.260	e.	28	ne.	20	18	8	4	4.7	2.2	1	2	4.59	1889	T.	1890
Tampa	44	30.13	30.15	0.46	72.0	0.0	90	83.4	52	60.7	33	11	60.9	72.7	0.55	0.00	4.260	e.	28	ne.	20	18	8	4	4.7	2.2	1	2	4.59	1889	T.	1890
Titusville	35	30.14	30.18	0.49	70.1	0.0	89	78.7	54	61.5	30	7	63.7	80.4	0.76	0.00	8.776	se.	37	ne.	20	21	7	2	8.3	1.2	1	3	2.58	1888	0.76	1890
Eastern Gulf States.																																
Atlanta	1,139	29.96	30.16	0.61	62.2	+0.2	83	71.4	42	53.0	32	5	47.0	66.5	2.04	2.11	6.436	nw.	40	nw.	10	8	13	9	11.5	2.4	3	12	8.20	1883	1.31	1885
Pensacola	56	30.08	30.14	0.43	68.4	+0.4	81	74.6	52	61.1	21	6	61.2	79.6	1.34	3.09	8.759	sw.	36	ne.	21	12	9	9	10.4	2.3	7	11	6.83	1886	0.94	1889
Auburn	35	30.11	30.15	0.43	68.0	0.0	84	76.2	42	55.4	26	8	60.0	80.4	1.98	3.62	6.697	se.	27	se.	3	8	13	9	8.5	3.4	7	10	10.92	1874	0.88	1873
Mobile	217	29.91	30.14	0.55	66.6	+0.6																										

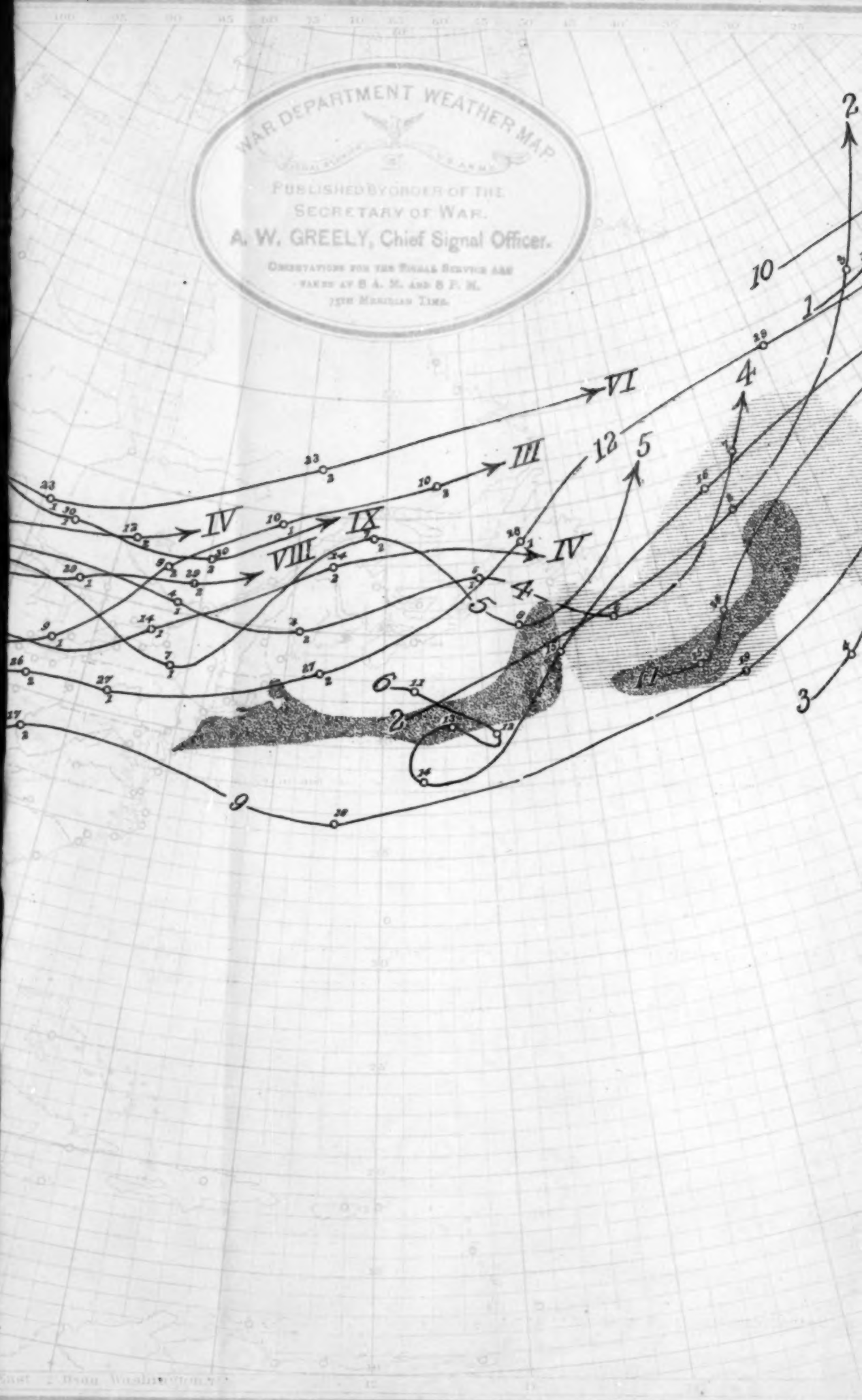
Table of miscellaneous meteorological data for April, 1890—Signal Service observations—Continued.

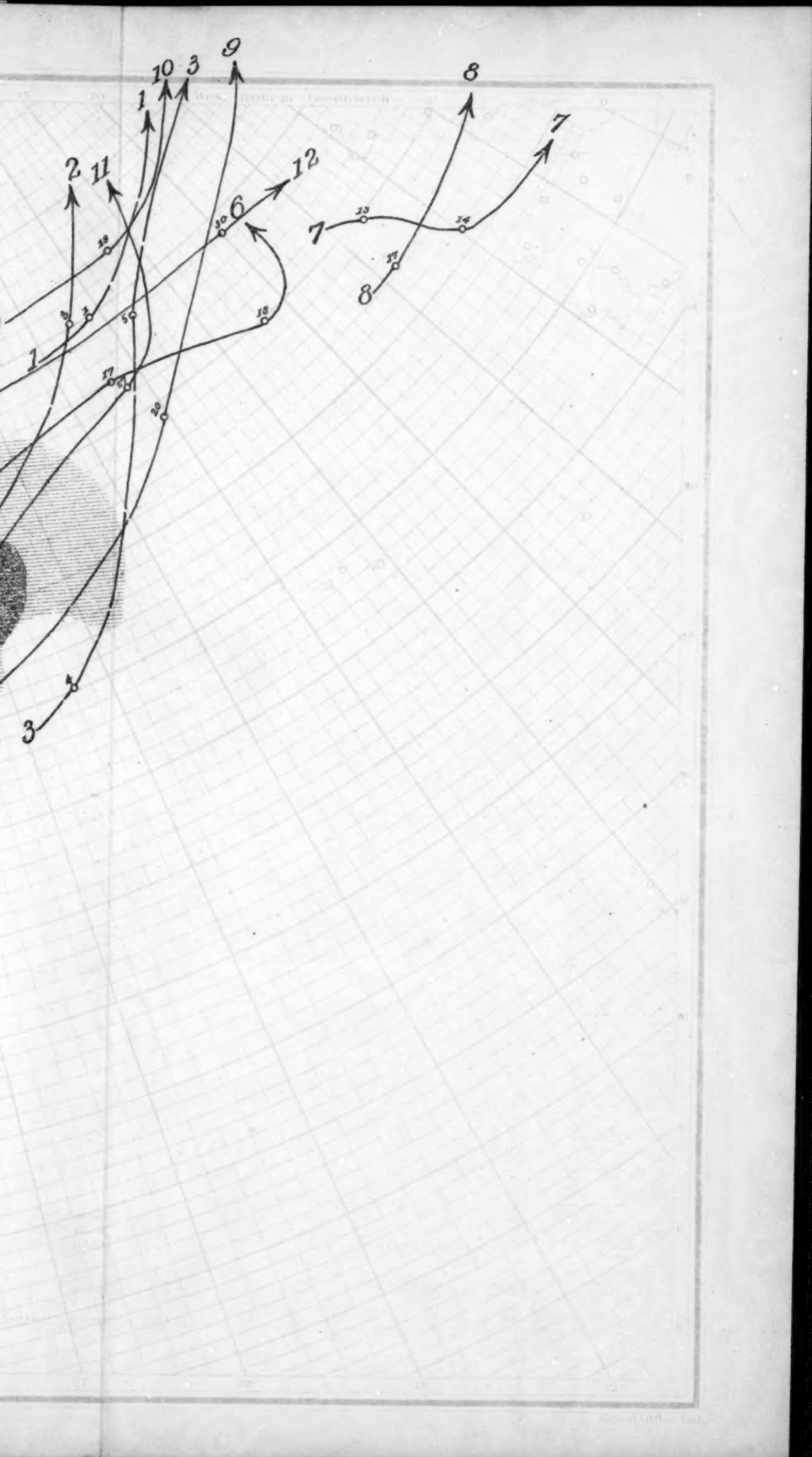
Stations and districts.	Elevation above level, feet.	Pressure, in inches.			Temperature of air, in degrees Fahrenheit.								Wind.										Precipitation data since opening of station.									
		Mean actual.	Mean reduced.	Monthly range.	Monthly mean.	Departure from normal.	Maximum.	Mean maximum.	Minimum.	Mean minimum.	Greatest daily range.	Least daily range.	Mean temperature of the dew-point.	Mean relative humidity, per cent.	Precipitation, in inches.	Departure from normal precipitation.	Total movement, miles.	Prevailing direction.	Maximum velocity.	Miles per hour.	Direction.	Date.	Cloudless days.	Partly cloudy days.	Cloudy days.	Days with rainfall.	Average cloudiness, tenths.	Length of record, years.	Greatest for month.	Year.	Least for month.	Year.
Es. northwest-Conn.																																
Fort Buford.....	1,900	27.97	30.02	1.04	43.6	+1.6	82	56.7	30	30.6	44	6	25.0	56.9	0.60	-0.73	6,950	e.	44	nw.	27	17	16	9	5.6	3.5	6	2.75	1879	0.48	1883	
Upper Miss. Valley.																																
Fort Yates.....					51.1	+1.2	86	66.0	12	34.2	50	17			1.23	+0.11		nw.										7	2.24	1887	c. 14	1888
St. Louis Valley.																																
Saint Paul.....	831	29.15	30.05	1.14	47.9	+1.8	83	58.4	19	37.2	41	4	31.8	60.4	1.80	-0.66	4,678	se.	37	nw.	9	10	14	6	8.4	6.0	20	5.14	1888	0.45	1879	
La Crosse.....	744	29.29	30.10	1.02	49.8	+2.8	81	60.1	31	39.4	35	5	30.6	55.5	1.77	-0.31	3,962	se.	39	nw.	9	13	11	6	9.4	6.4	18	3.63	1877	0.42	1879	
Davenport.....	613	29.41	30.07	1.08	52.0	+3.6	81	63.0	27	42.3	35	0	37.0	61.0	0.86	-1.90	8,112	e.	38	nw.	9	13	14	4	8.4	4.4	19	5.39	1876	0.77	1884	
Des Moines.....	869	29.11	30.04	0.98	52.6	+1.8	83	63.4	25	42.3	36	4	30.7	59.0	0.78	-1.99	7,551	se.	35	sw.	26	19	5	6	8.4	5.4	12	4.32	1886	0.78	1890	
Dubuque.....	651	29.36	30.08	1.07	51.2	+2.2	78	61.3	26	41.2	31	6	42.0	75.4	2.94	+0.16	4,549	se.	24	sw.	28	13	12	5	10.3	5.3	17	4.47	1882	1.30	1881	
Keokuk.....	613	29.42	30.08	1.02	54.7	+1.7	84	64.9	27	44.5	33	3	41.0	65.2	1.79	-1.08	5,575	e.	36	sw.	11	12	7	11	10.4	5.5	10	5.65	1873	0.89	1875	
Calmar.....	359	29.70	30.08	0.73	59.2	+0.2	80	66.0	36	52.4	25	3	46.0	69.0	3.76	-1.32	7,386	e.	30	sw.	11	10	5	15	10.5	7.5	19	7.57	1874	0.97	1889	
Springfield, Ill.....	644	29.38	30.07	1.04	54.0	+0.0	85	64.2	26	43.8	36	5	42.2	68.7	2.94	-0.35	6,846	e.	48	sw.	3	10	9	11	10.4	8.6	3	6.36	1885	0.71	1889	
Saint Louis.....	571	29.48	30.09	0.93	55.2	+0.2	89	66.1	30	48.2	38	5	44.0	65.6	4.05	+0.57	9,426	sw.	30	sw.	3	12	9	9	14.4	9.4	20	6.87	1873	0.45	1871	
Missouri Valley.																																
Columbia.....					56.8	+0.69	88	68.5	29	45.2	40	5			2.17	-1.55	6,905	ne.	40	sw.	11	7	8	15	9		6.1	1				
Kansas City.....	947	29.05	30.06	0.90	57.0	+0.90	86	66.5	30	47.6	37	7	42.4	66.1	2.61	-1.00	6,921	sw.	38	sw.	12	7	10	13	10.5	9.6	5	2.80	1889	2.61	1890	
Springfield, Mo.....	1,135	28.61	30.05	0.65	58.2	+0.8	88	67.5	32	49.8	34	5	43.8	68.6	3.57	+0.69	5,440	e.	40	sw.	3	10	7	13	11.6	5.5	5	4.41	1889	1.82	1888	
Leavenworth.....	842	29.15	30.07	0.92	56.6	+1.8	90	68.6	29	46.6	41	4	44.8	71.8	2.23	-1.29	6,532	sw.	36	sw.	11	7	9	14	11.5	6.4	9	7.66	1876	0.97	1883	
Topeka.....					56.0	+0.90	89	68.5	24	43.6	53	9			1.89	-1.89		.....	.....	.....	.....	14	11	8	.....	3	2.80	1889	1.36	1888	
Omaha.....	1,113	29.88	30.06	1.00	55.2	+3.3	86	65.9	23	44.4	40	8	36.0	56.1	1.55	-1.72	7,340	sw.	36	nw.	8	10	13	7	6.4	2.4	20	6.34	1885	0.55	1880	
Crete.....					54.6	+0.8	89	67.9	20	41.4	44	5			1.31	-1.31		.....	.....	.....	.....	12	7	11	6	.....	3	2.70	1889	1.31	1890
Valentine.....	2,613	27.31	30.05	0.91	50.0	+0.8	83	63.3	17	36.6	42	9	32.4	58.4	1.33	-0.32	8,439	n.	54	n.	8	12	8	3	5.4	6.4	5	3.78	1889	1.05	1888	
Sioux City.....	1,158	28.78	30.03	1.08	52.1	+0.8	88	64.3	13	39.9	44	10	33.5	58.3	1.32	-1.04	7,802	sw.	40	sw.	5	12	8	10	9.5	2.3	6
Fort Sully.....	1,600	28.31	30.02	1.16	51.2	+0.8	86	64.4	18	38.0	46	6	31.6	53.3	0.58	-1.04	7,328	sw.	54	ne.	11	13	9	8	4.4	8.4	0	1.4	1877	0.14	1884	
Huron.....	1,307	28.02	30.02	1.06	49.5	+3.5	84	63.7	17	35.3	51	10	31.2	55.2	0.64	-1.96	7,773	sw.	40	sw.	19	16	6	6	6.3	6.2	9	4.18	1882	0.64	1890	
Yankton.....	1,232	28.70	30.02	1.08	45.4	+1.4	86	63.5	15	39.4	43	12	34.0	57.8	1.73	+0.39	7,939	sw.	48	nw.	8	11	9	10	6.4	8.4	1	5.99	1877	0.24	1874	
Northern Slope.																																
Fort Assiniboine.....	2,690	27.16	30.00	0.81	41.8	+0.8	79	58.2	17	31.4	41	10	21.2	46.2	0.68	-0.91	9,916	sw.	63	w.	10	7	10	13	16.7	5.8	10	2.68	1882	0.06	1890	
Fort Custer.....	3,040	26.82	29.99	0.76	45.4	+0.6	80	60.4	17	30.4	47	7	33.8	68.6	0.56	-0.68	6,217	sw.	42	nw.	7	17	6	7	7.3	4.5	11	2.16	1887	0.51	1885	
Fort Maginnis.....	4,340				43.7	+2.7	74	55.1	12	32.3	35	5			1.30	+0.14		nw.	.....	.....	.....	11	11	8	5	.....	8	3.21	1888	0.39	1883
Helena.....	4,056	25.84	30.02	0.68	45.6	+2.6	78	58.0	20	34.5	35	5	19.3	44.2	2.25	-1.14	4,546	w.	30	nw.	7	11	8	11	6.5	5.8	11	2.69	1886	0.11	1889	
Rapid City.....	3,280	26.62	30.02	0.78	45.7	+2.6	82	58.6	8	34.0	40	6	27.7	54.8	1.55	+0.12	6,362	n.	60	n.	8	12	8	10	9.4	5.7	6	4.22	1889	0.41	1888	
Cheyenne.....	6,105	24.09	30.01	0.50	43.2	+1.2	72	53.9	13	32.5	38	5	26.2	60.4	3.93	+3.66	6,766	nw.	56	nw.	8	13	7	10	12.3	9.5	5	3.93	1890	0.17	1880	
Fort McKinney.....	5,000	24.94	29.99	0.70	45.0	+0.8	80	59.5	13	33.4	33	9	34.9	73.4	0.70	-1.32	5,644	n.	66	nw.	8	7	10	13	8.4	0.5	3	0.76	1890	0.41	1889	
Fort Washakie.....	5,580	24.45	30.02	0.53	42.4	+0.8	72	56.2	6	28.5	41	6	18.6	47.6	0.64	-1.41	5,193	sw.	36	w.	8	15	8	7	3.1	5.1	5	3.32	1883	0.64	*	
North Platte.....	2,847	27.11	30.06	0.76	49.0	+0.9	85	62.4	20	37.4	51	5	34.4	62.8	4.46	+2.47	7,995	sw.	60	nw.	8	15	12	10	12.5	5.4	16	6.31	1875	0.16	1880	
Middle Slope.																																
Colorado Springs.....					47.5	+0.8	74	59.9	16	35.1	41	7	27.3	58.8	3.90	-0.91		.....	.....	.....	.....	10	13	7	7.4	3.5	6	3.90	1890	0.27	1875
Denver.....	5,281	24.76	30.00	0.53	48.0	+0.0	77	60.0	20	36.0	40	5	23.4	48.5	2.50	+0.42	5,338	n.	48	nw.	8	8	13	9	9.4	5.8	19	4.04	1885	0.05	1878	
Pueblo.....	4,733	25.23	30.02	0.61	50.5	+0.8	79	64.2	20	36.0	46	5	19.8	45.5	2.08	-0.68	6,945	e.	45	nw.	8	8	13	9	7.4	7.5	2	2.08	1890	1.57	1889	
Concordia.....	1,410	28.55	30.05	0.88	55.6	+0.8	92	62.2	34	44.0	48	0	40.2	65.4	3.22	+0.22	7,579	sw.	48	nw.	8	15	6	9	6.5	1.3	8	3.48	1889	0.65	1888	
Dodge City.....	2,533	27.39	30.03	0.69	54.2	+0.8	89	65.6	35	42.9	45	2	36.4	67.0	2.90	+1.32	9,196	sw.	54	n.	8	13	8	10	9.5	1.5	6	4.08	1888	0.11	1880	
Wichita.....	1,366	28.57	30.03	0.72	57.0	+0.8	91	67.2	32	46.7	33	4	45.0	73.0	3.63	-0.63																

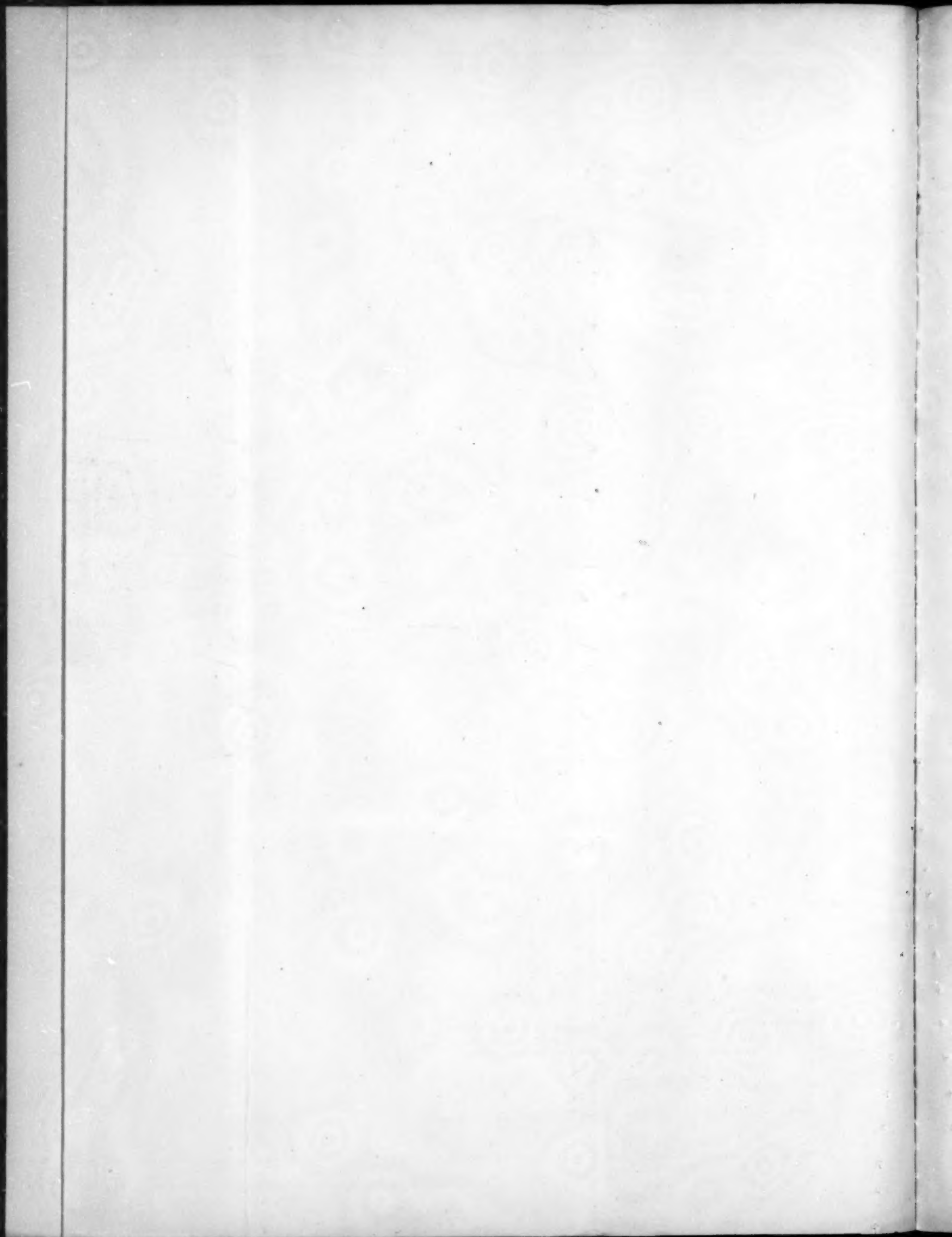


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Chart I. Tracks of Areas of Low Pressure. April, 1890.







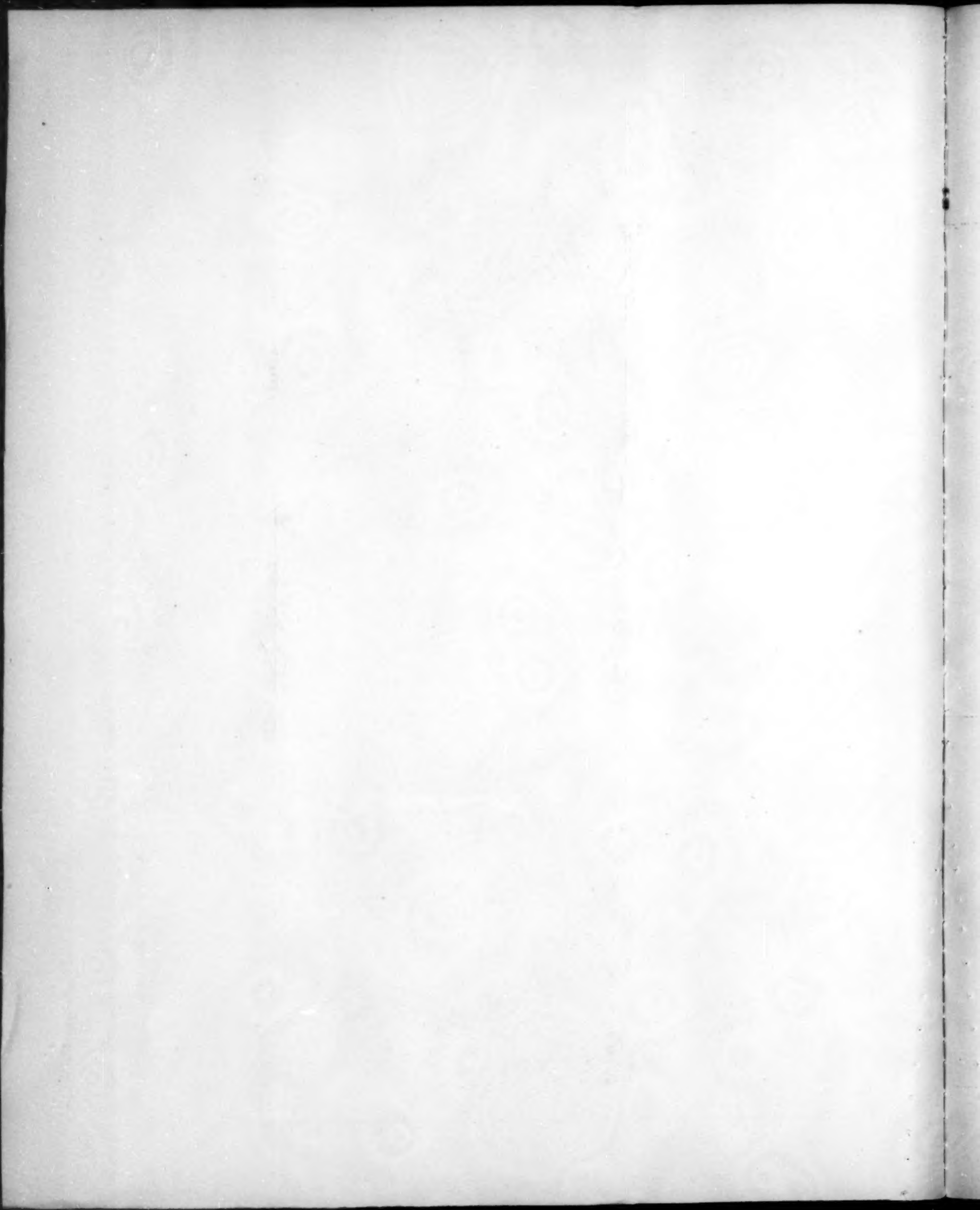
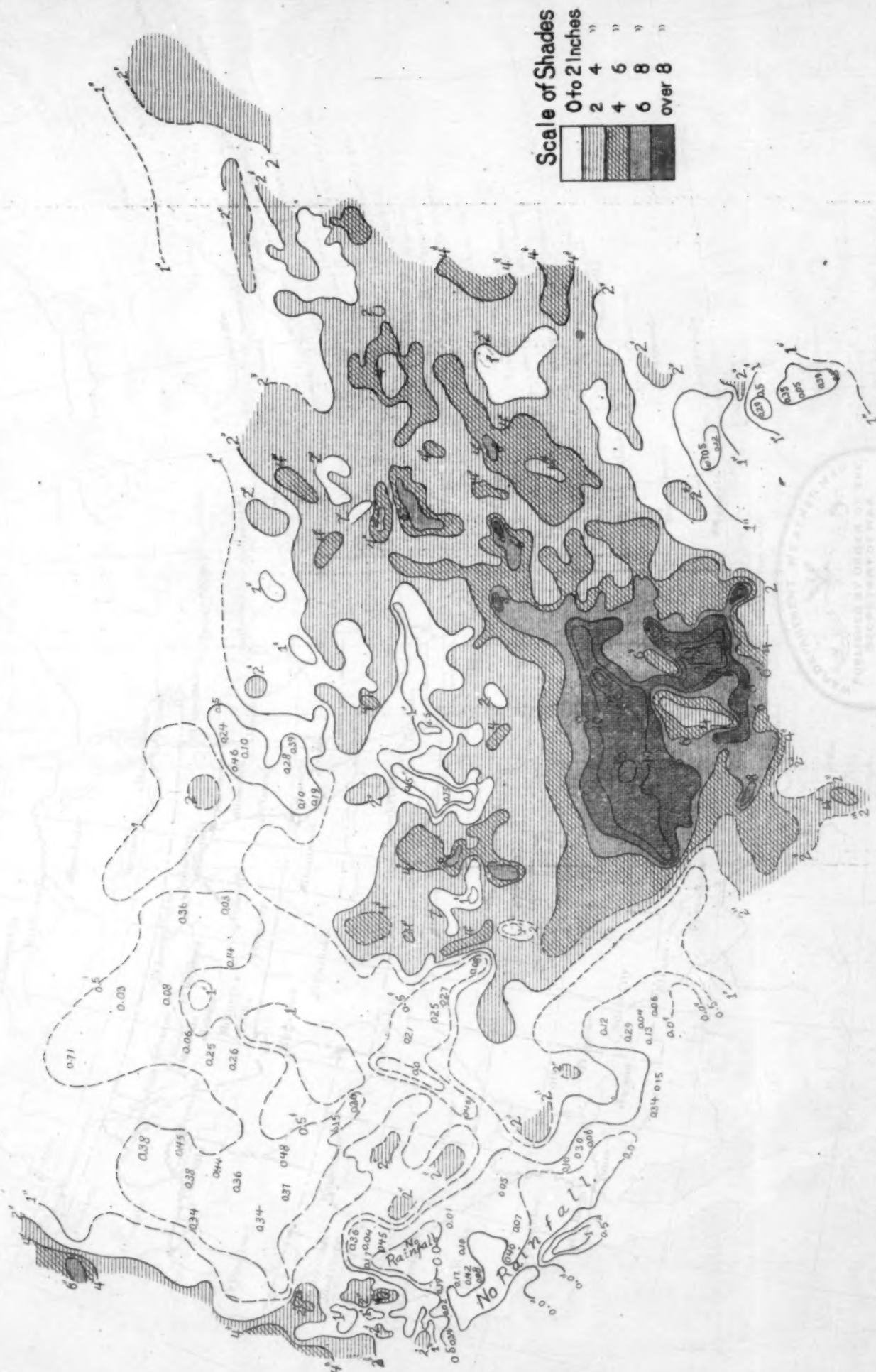


Chart III Precipitation. April, 1890.



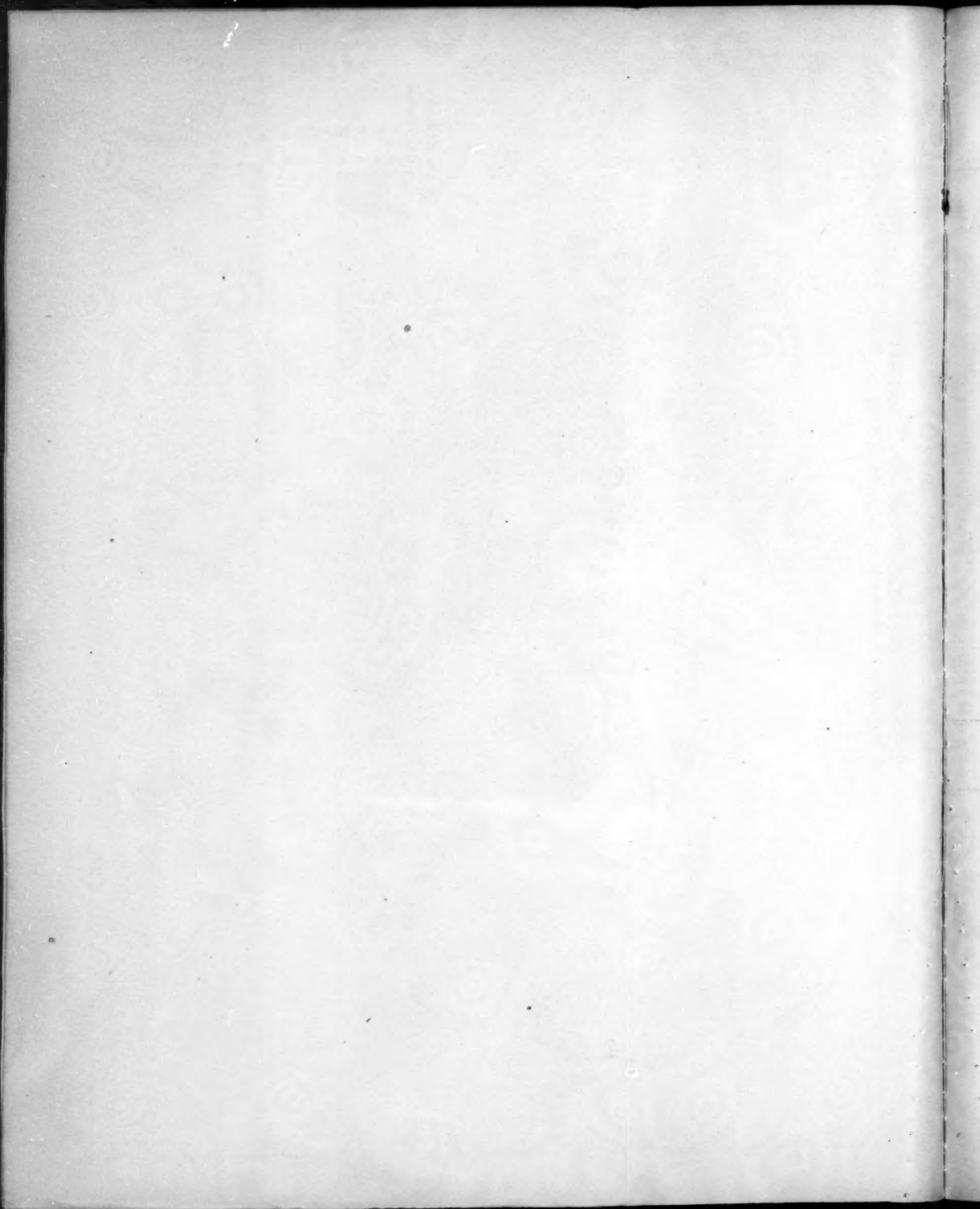
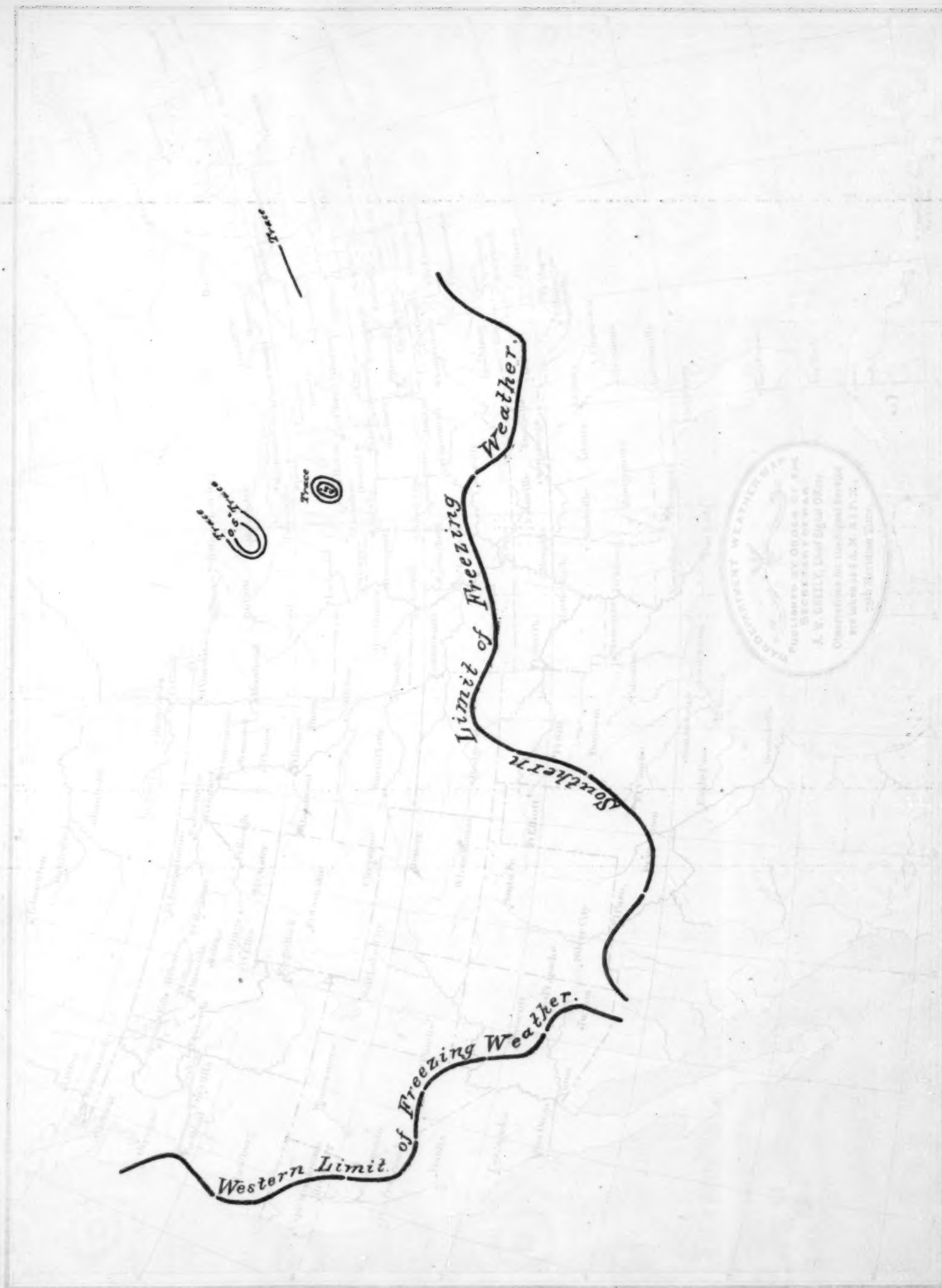
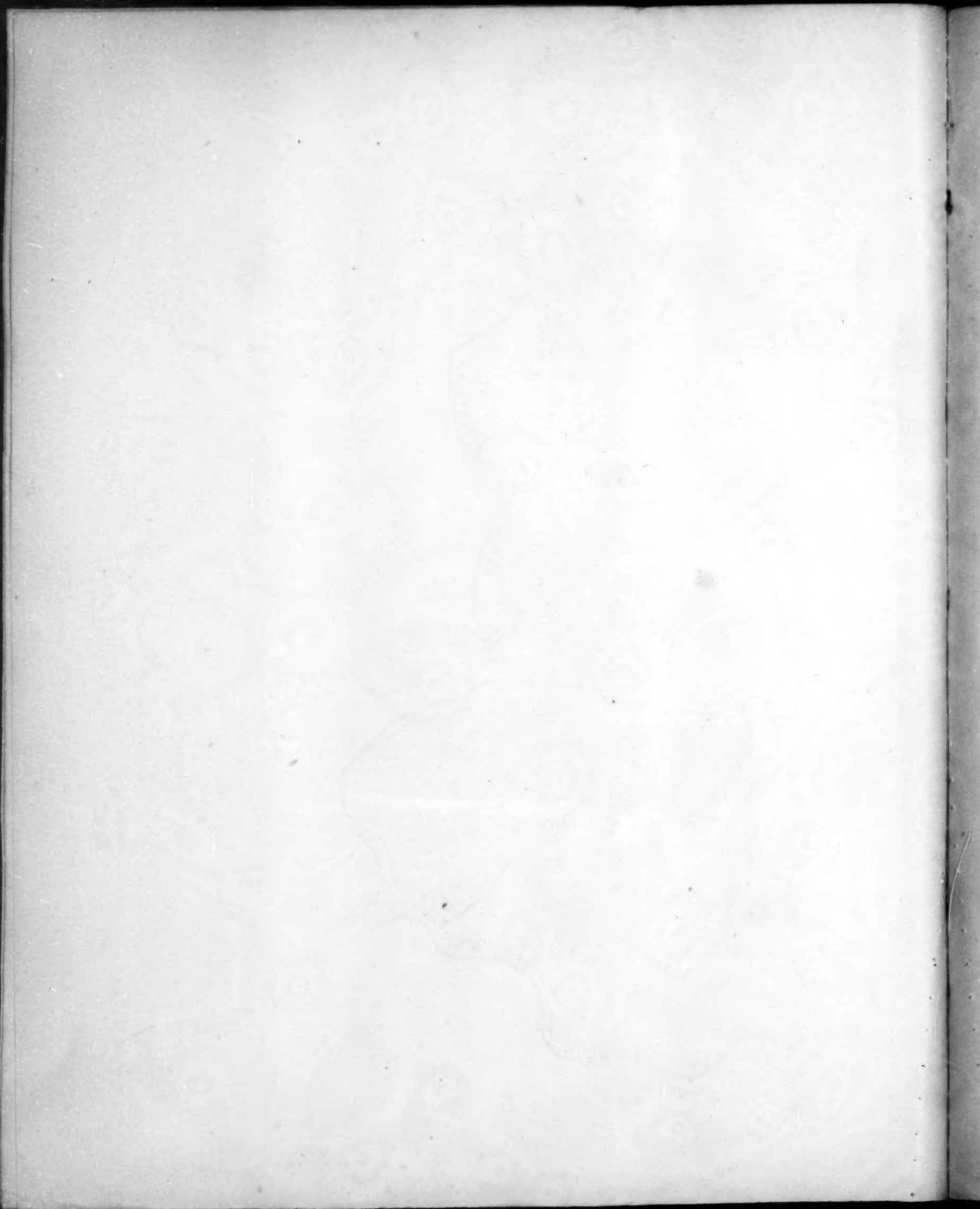


Chart IV. Depth of Snow (inches) reported on ground April 30, 1890, and Limits of Freezing Weather.





List of merchant marine steam and sailing vessels from which International Meteorological reports were received at the office of the Chief Signal Officer, U. S. Army, Washington City, in time to be used in the preparation of the Monthly Weather Review for April, 1890—Continued.

Name of vessel.	Captain.	Name of vessel.	Captain.	Name of vessel.	Captain.
<i>Sailing vessels—Continued.</i>					
Am. bkt. Bonnie Doon	Chas. Burgess.	Am. Jane Adeline	G. W. Cates.	Nor. bk. P. A. Munch	C. O. Bernt.
Ger. bk. Charlotte and Anna	E. Kruger.	Am. bg. Jennie Huriburt	D. B. Darrah.	Prince Eugene	C. F. Nygaard.
Am. bkt. Christina Redman	E. A. Watts.	Br. bk. John Johnson	O. H. Henderson.	Br. sp. Queen of Scots	John Lamb.
Ger. sp. Cleopatra	A. v. Seggern.	Am. schr. John R. Bergen	W. H. Squires.	Nor. bk. Qvos	G. Olsen.
Am. schr. Compeer	I. H. Petersen.	bkt. Jose E. Moore	A. Leonhard.	Am. schr. Roger Drury	John Delay.
Am. bkt. D. A. Brayton	H. R. Combs.	Port. bk. Julius	F. D. Vieira.	Am. sp. Sachem	J. C. Bartlett.
Ger. sp. Doris	N. Ohling.	Ger. bk. Jupiter	F. Gerlach.	bk. Sarah	L. R. Hale.
Am. schr. D. W. McLean	G. W. Thomas.	Am. schr. Kate Church	J. H. Weeks.	bk. Shetland	D. H. Haskell.
schr. Elsie A. Bayles	B. Benson.	bk. Kennard	J. A. Bettencourt.	Ger. sp. Stella	A. Hogeman.
schr. Estie H. Lister	S. D. Mason.	Br. Lady Nairn	Thos. Richards.	Br. sp. Stieve Roe	J. McMullan.
sp. Fred Billings	J. W. Sherman.	Aust. Leandro	L. M. Martinolich.	Am. schr. Sullivan Sawan	R. Pitcher.
bk. G. N. Wilcox	W. Rasch.	Am. sp. Light vessel No. 45	Andrew Jackson.	Br. bgt. Ubaldina	H. F. Schive.
Am. schr. Harbeson Hickman	B. Collette.	Br. bk. L. M. Smith	S. J. Smith.	It. bk. Virgine della Guardia	S. Olbano.
Br. bgt. Hattie Louise	W. H. Barnard.	sp. Manydown	Callendar.	Am. schr. Warren Adams	C. A. Colcomb.
Am. bg. H. B. Hussey	G. W. Hodgdon.	Am. bk. Mary Hasbrouck	W. Ludwigs.	bg. Woodbury	R. Cosgrove.
schr. Henry A. Faber	H. E. Garlick.	Neptune	J. Fred Hill.	Am. bk. Wakefield	B. C. Howes.
Port. bk. Industria	A. Duarto.	Swed. bg. Pepita	N. Johansson.		

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